Volume XVIII.
Number 6.

JUNE, 1900.

$3.00 Per Year,
Including Directory.
25 Cents Per Copy.

TEXTILE WORLD,

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PERIODICAL DIV.

and Industrial Record.

1900 DIRECTORY.

The Textile World's Official Directory of the Textile Mills for 1900 (400 pp. with maps, etc.) will be published in latter part of June. It has been completely revised. Several new map plates have been engraved for it. Hundreds of New Mills have been added and thousands of changes have been made. The delivery to those entitled to receive it takes some time, but all entitled will receive a copy in due course.

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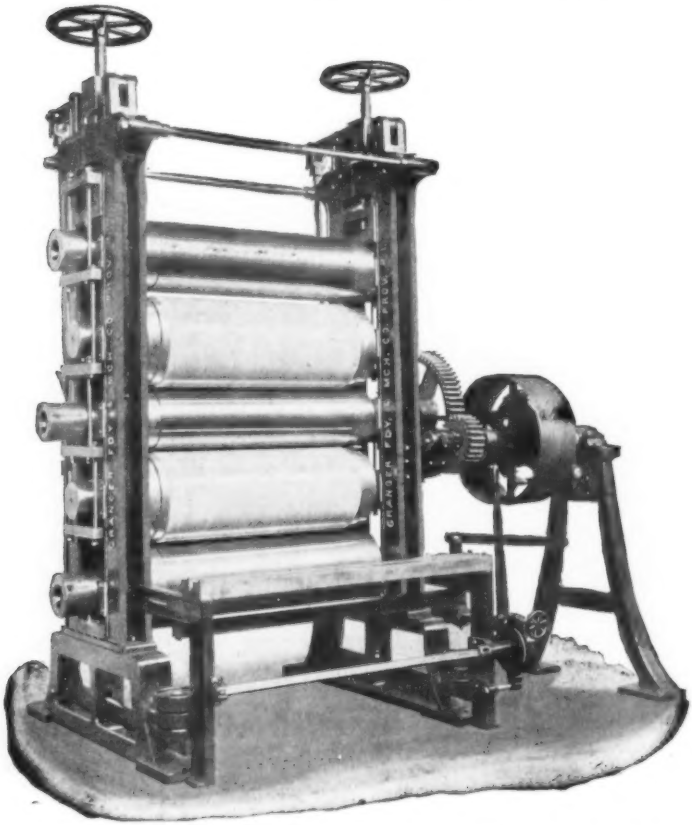
CLASSIFIED INDEX FOR BUYERS - - Page 1083

GUILD & LORD,
PUBLISHERS.

620 ATLANTIC AVENUE,
BOSTON, MASS.

Bleaching, Dyeing, Drying,

And Finishing Machinery.



CALENDERS, MANGLES AND ROLLS.

TENTERING MACHINES,
MERCERIZING MACHINES.

Granger Foundry and Machine Co.

PROVIDENCE, R. I.

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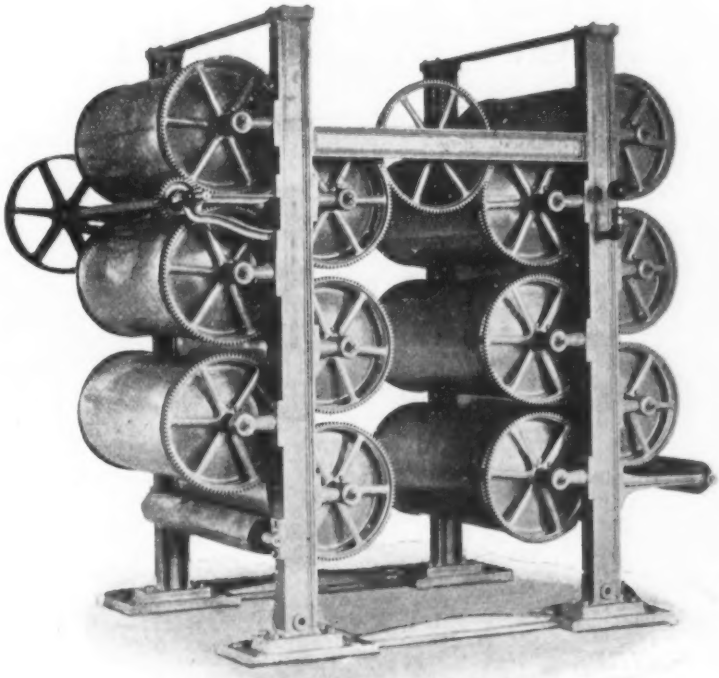
MACHINERY,

For Textile Fabrics



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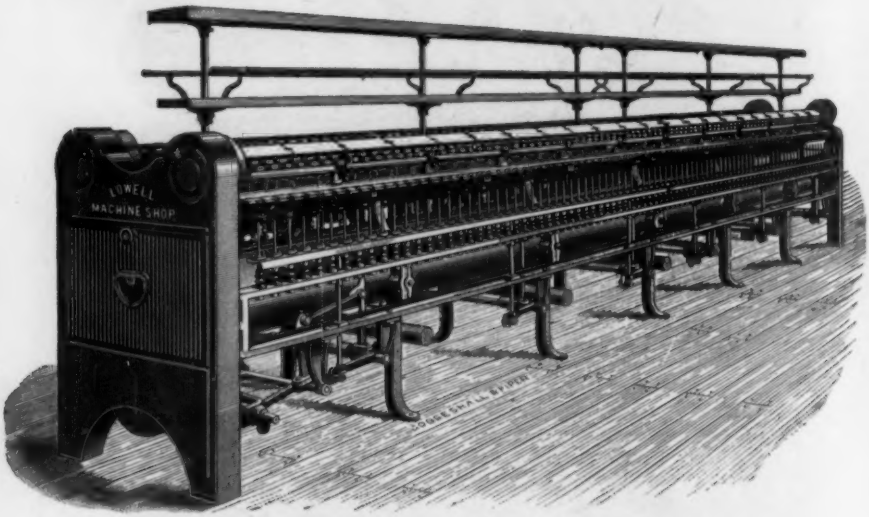
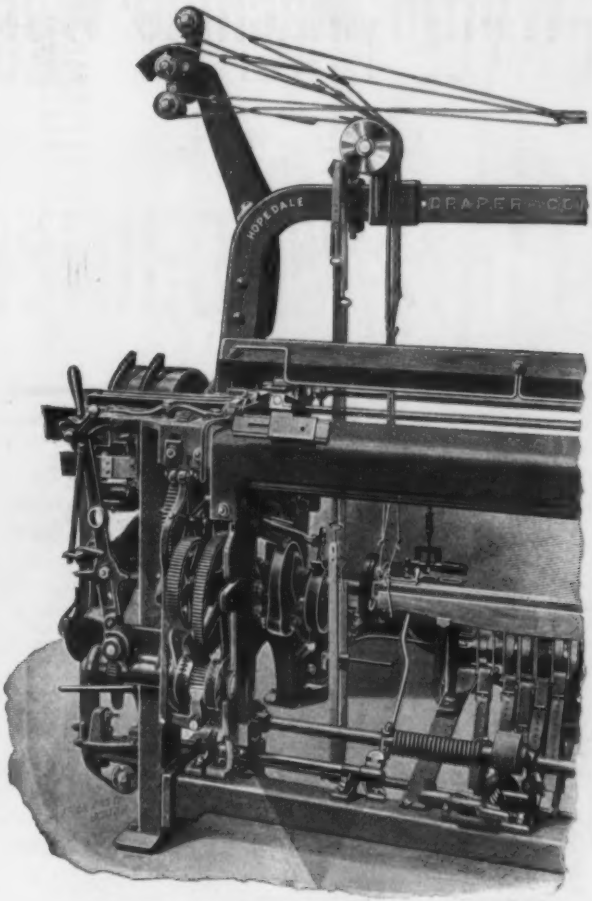


Revolving Flat Cards,
Railway Heads,
Drawing Frames,
Roving Frames,
Ring Spinning Frames,
Twisters, Spoolers,
Warpers, Slashers,
Looms.

WORSTED MACHINERY.



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WE INVITE CORRESPONDENCE.

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Long Chain Quilling Machines, Drawing Frames,
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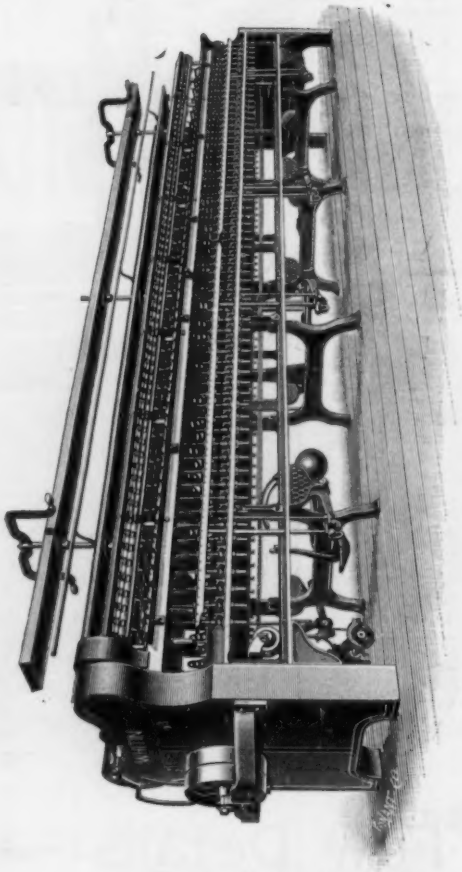

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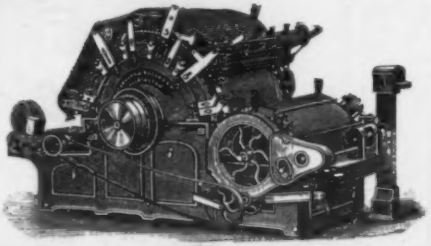

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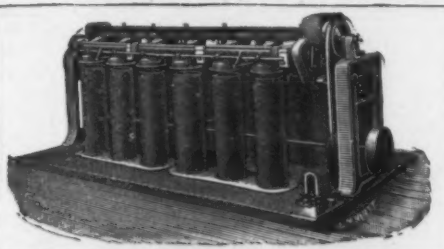

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Slubbing, Intermediate, and Roving Machines.

New patented Differential motion, New Arrangement of Cone Drums, New System of Balancing top or bobbin rail, etc.

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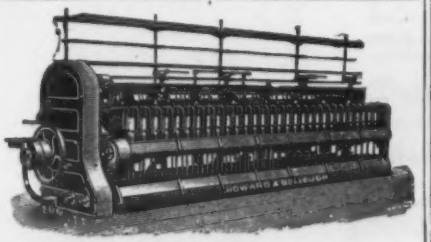

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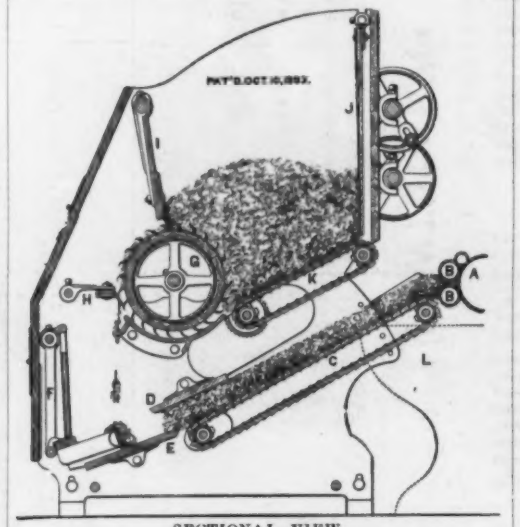
WOONSOCKET WORSTED MILLS,
EDWIN FARNELL, Agent.



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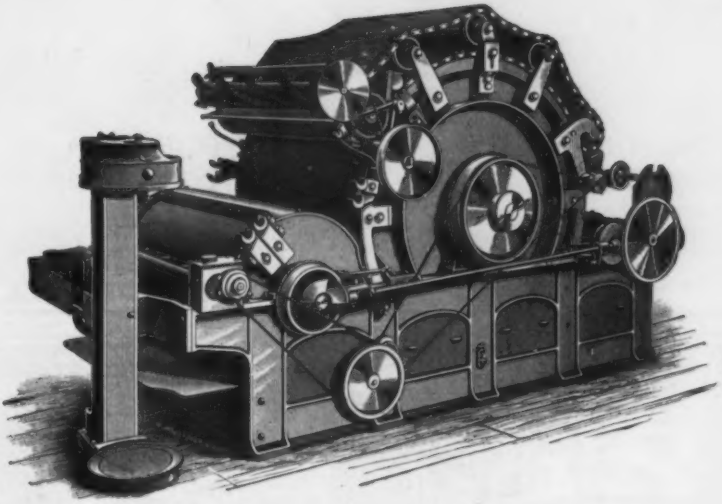

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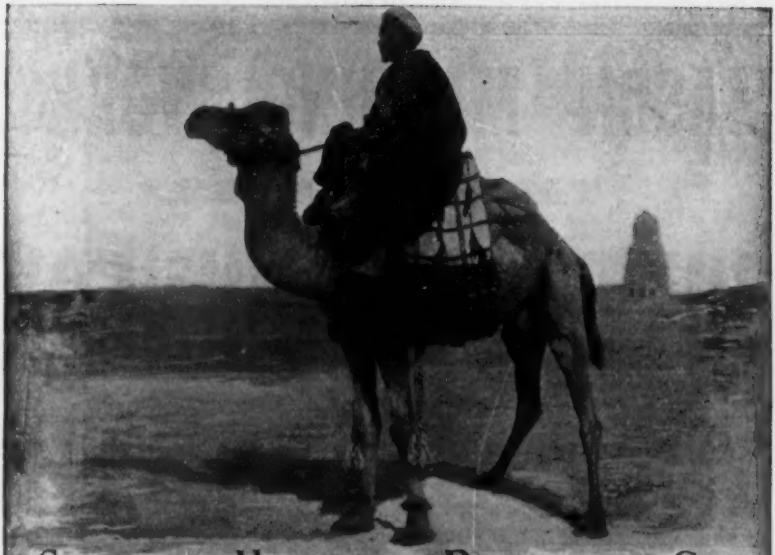

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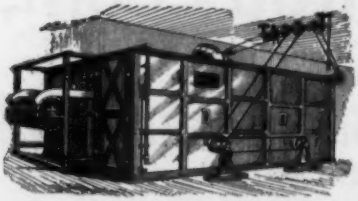

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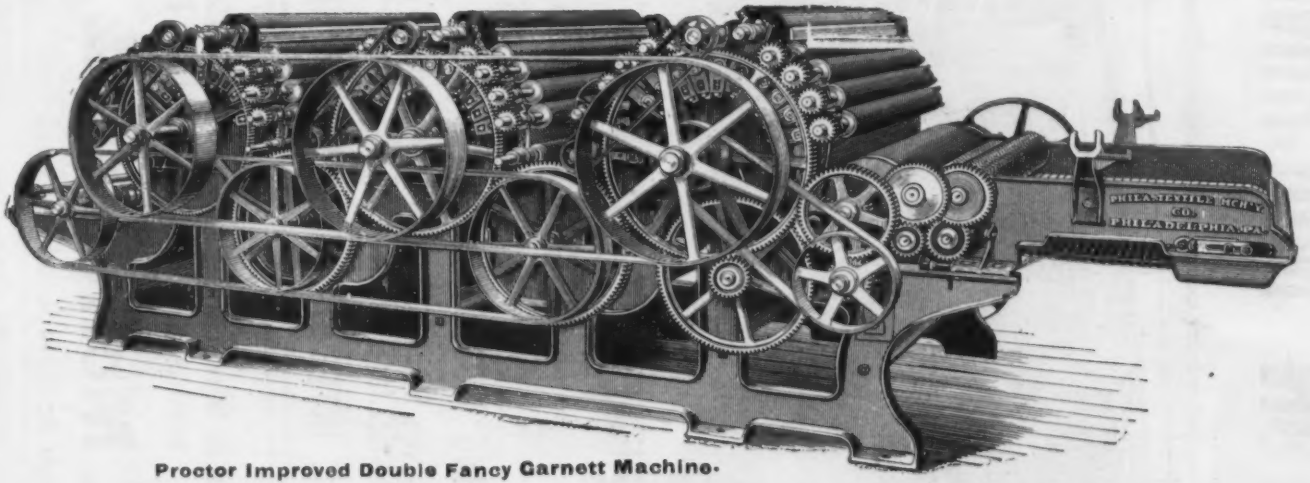

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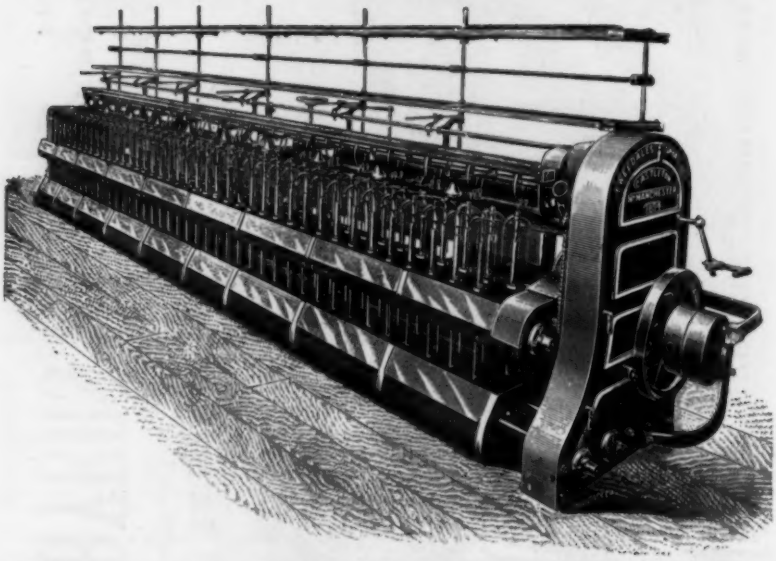

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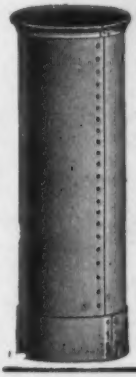

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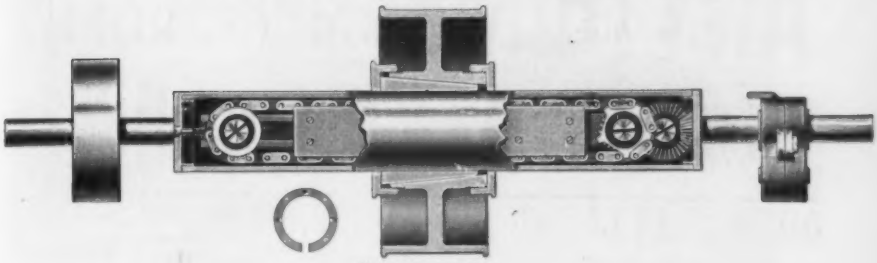

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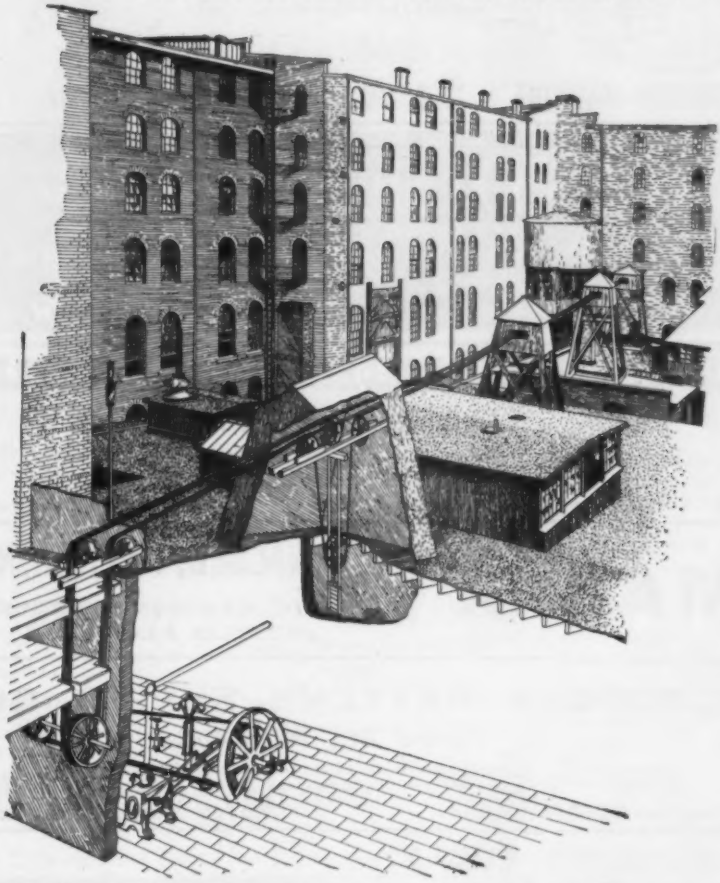

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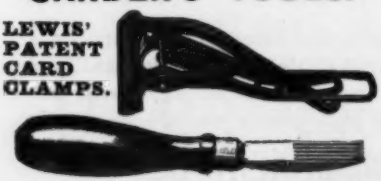

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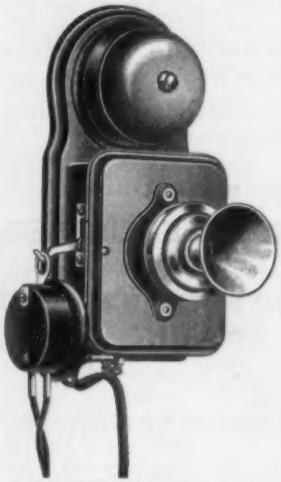

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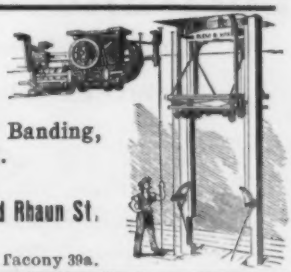

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List of Textile Patents.

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Bobbin. 649,638 and 649,639. Eli E. Hendrick, Carbondale, Pa.

Braiding Machine. 649,618. Conrad Schutz, Philadelphia, Pa., assignor of three-fourths to T. K. Ober, E. M. Cooper, and H. D. Beaston, same place.

Carding Machine Alarm Attachment. 649,366. J. W. Scott and S. A. Leach, Warren, Me.

Carding Engine Feeding Mechanism. 650,220. E. V. Bates, Dracut, Mass., assignor of one-half to G. A. Judson, Lowell, Mass.

Carding Engine Feeding Mechanism. 650,221. E. V. Bates, Dracut, Mass.

Cards, Machine for Repeating Pattern. 650,340. Vernon Royle and Wm. Cochran, Paterson, N. J.

Carding Machine, Continuous. 648,694. Conrard Koenig, Wegnez, Belgium.

Cloth and Dyeing Same, Gray. 650,752. Wilhelm Elbers, Hagen, Ger., assignor to the Badische Anilin and Soda Fabrick, Lardwigshafen, Ger.

Combing Machine Dabbing Apparatus, Wool. 650,601. Jonas Denby, Oxenhope, Eng.

Drying and Stretching Frame. 648,745. Sylvius Hoff, Freiberg-in-Brisgau, Ger.

Dyer's Shell. 648,420. Adolph Martin, Passaic, N. J.

Fibre Cleaning Machine. 649,215. F. G. Sargent, Graniteville, Mass.

Knitted or Netted Fabric. 648,581 and 648,582. Gottlieb Benger, Stuttgart, Ger.

Knitting Machine. 649,162. Wm. R. Dillmore, Philadelphia, Pa., assignor to Keystone Knitting Machine Mfg. Co. of Pennsylvania.

Knitting Machine. 649,021. C. J. A. Wardwell, Laconia, N. H., assignor to G. H. Tilton, same place, T. S. Fuller, Gilford, and Ashland Knitting Co., Ashland, N. H.

Knitting Machine. 649,378. N. W. Westcott, Providence, R. I., assignor of one-half to J. M. Goff, same place.

Knitting Machine, Circular Rib. 649,243. Thos. Henry, Muncie, Ind.

Knitting Machine. 650,376. Hermann Downer, Chemnitz, Ger.

Loom. 648,898. W. C. Cobb and A. B. Adkins, Pelzer, S. C., assignors to the Draper Co., Portland, Me., and Hopedale, Mass.

Loom. 648,644. W. S. Thomas, Boston, Mass., assignor of one-half to Whitin Machine Works, Whitinsville, Mass.

Loom Dobby. 648,739. O. A. Haenichen, Jerome Fulhaber and Ernest Riedel, Paterson, N. J.

Loom Shuttle. 648,547. Camille Brun and Gustave Brun, St. Ettienne, France.

Loom Take-up Mechanism. 648,903. A. D. Emery, Taunton, Mass., assignor to Draper Co., Portland, Me., and Hopedale, Mass.

(Continued on page 1110.)

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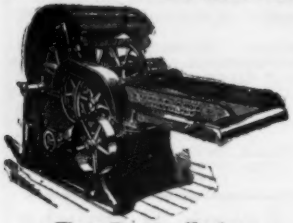

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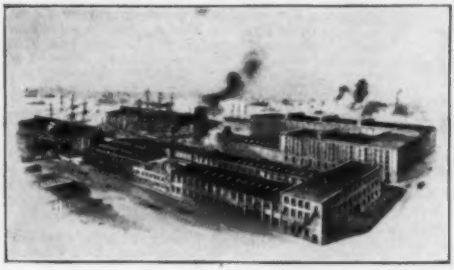

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TEXTILE WORLD.

Vol. XVIII. JUNE, 1900. No. 6.

L. W. FAULKNER.

The subject of this sketch was born on the 12th of April, 1815, in Billerica, where he is living today. He is a direct descendant of Edmund Faulkner, who came from England to America, with Deacon Trowbridge. They were the first settlers of the town of Andover, founding there the Andover church.

Mr. Faulkner's grandfather was Col. Francis Faulkner, who rendered valuable service to his country during the Revolution, as a member of the Provincial Congress, in 1874, and member of the Committee of Public Safety during the Revolution. The Colonel resigned the commission which he held under George III, renounced allegiance to England, and was elected major in the Continental army. He served faithfully during the war and was promoted to Lieutenant-Colonel. He commanded troops at the North Bridge, Concord, on the 19th of April, 1775; at Dorchester Heights; and at the surrender of Burgoyne at Saratoga. He was in command of the regiment which guarded Burgoyne and the British prisoners, after the surrender.

Mr. Faulkner's father, Francis, came to Billerica in 1810, and established a mill on the present site of the Faulkner Mills. At this time, woolen manufacturing was in a primitive state, as compared with modern mills. Only a portion of the work was done in the mill itself. There were no looms or spinning machinery in the mill. The wool was carded there into rolls. These rolls, as they came from the card, were about two and one-half feet long and one-half inch in diameter. They were taken from the mill to the farm houses, where the farmers' wives and daughters spun and wove them by hand. This homespun cloth was then returned to the mill to be fulled and finished.

Not only were the mechanical processes of this primitive description, but the business methods were of a like nature. In the place of the complex method of selling and distribution of manufactured goods of today they then disposed of their finished product mainly by a system of barter. Little jags of wool grown by the farmer were brought to the mill, to be either manufactured into cloth for him, or exchanged for finished goods.

Mr. Faulkner's first work was on the picker in this mill. After a long and faithful service as a worker in the mill, he formed a partnership with his father and brother, in 1840, under the name of Francis Faulkner & Sons. This firm manufactured flannels from 1840 to 1850, when the subject of this sketch engaged in the same business, at Fisherville, N. H., in the firm of Harris & Faulkner, where he remained for ten years. In 1860 he began the manufacture of flannels, fancy cassimeres and ladies' goods, in Lowell, Mass. Here, his sons were associated with him, under the name of L. W. Faulkner & Sons, where for 38 years he was actively engaged in woolen manufacturing until 1898, when he disposed of his large mills to the American Woolen Company. One of his sons, John A., became agent of the mills for the American Woolen Company, and the other one, Frederick, engaged in manufacturing at Stafford Springs, Conn.

Mr. Faulkner's life has been con-

temporaneous with the development of woolen manufacturing in America. He has witnessed and been a factor in the progress from the simple methods of the country custom mill to the modern factory system with its immense mills and thousands of employees.

Woolen manufacturing owes much to such men as he, who, during a long lifetime, have industriously and patiently devoted themselves to its development.

His business career is a continuous record of fair dealing, and now at the age of 85 he is enjoying in honorable retirement a well earned rest and the respect of all.

CO-OPERATIVE COTTON MANUFACTURING.

An enterprise which has attracted much notice is projected in Fall River, by labor leaders and other citizens of that place. The plan is to form a corporation with a capital of $1,000,000, to build and operate a cotton mill there. The bulk of the stock is to be owned by the operatives of the mill, although limited subscriptions are received from anyone desiring to invest in the enterprise. It is the expectation of the promoters of this enterprise, that by means of a cotton mill operated under the control of the mill employees, the operatives will learn the exact cost of manufacturing cotton goods, and the amount of waste in the process of manufacture. This information has, in the past, been very much desired by representatives of labor, as a means of adjusting the differences of opinion between operatives and mill owners, as to what is a fair rate of wages.

The promoters expect that a mill run under such management will be greatly benefited by the extra care which each operative, who will also be an owner, will take in his work, and the economy which he will exercise in regard to waste, etc. Of course, this idea of co-operative manufacturing is not new. It has been tried before; sometimes with failure, and at other times with success. While differences of opinion exist in regard to this particular scheme now proposed at Fall River, there is but one desire on the part of all in regard to it, and that is that it should be a success, and a means of bringing about a better understanding between the laborer and the mill owner.

The mill owners think that if such a plan is carried out, the working people will, by actual experience, learn the difficulties with which manufacturers have to contend, and the vast difference between conditions where a definite compensation for services rendered is regularly received and the conditions, which face the manufacturer, whose compensation is most uncertain, subject to influences from every part of the world, and liable to be suddenly turned into a loss.

On the other hand, the working people believe that by operating a mill under their own control and ownership, they will be able to demonstrate what large profits are being made in the business; what great economies can be effected; and how small an amount of the profits of the business are now being received by the workers in the form of wages.

This enterprise, should it materialize, may not demonstrate that capital and labor may be combined under our modern factory system, in one and the same individual, but it may, and we trust it will make it more evident to both capital and labor that the interests of these two are identical. Both receive their compensation from the money exchanged for the manufactured goods. When the profit is small, the reduced returns should, in all fairness, be shared by both. On the other hand, in prosperous times, when profits increase, this increase should be shared in the same way. This proposition is generally agreed to by both parties. The only difficulty has been in deciding in particular instances in regard to what is, and is not, a fair return for labor. This

question will still come up for settlement from time to time, in accordance with the varying conditions of the market for cotton goods. At such times it will be a great aid to an amicable settlement if the employer and employee each understands the position of the other and knowing what is fair, ask for nothing more. If this projected co-operative mill should make such understanding easier it will be for that reason alone of vast benefit to all.

MOHAIR IN SOUTH AFRICA.

During S. C. Schreiner's visit to England, he gave an interview in which were many interesting statements in regard to the growing of mohair in Africa. While there was an attempt in 1838 to introduce the Angora goat into South Africa, this first experiment proved a failure, and up to 1856 Turkey enjoyed a complete monopoly of the business.

In 1856, Sir Titus Salt succeeded in carrying out a project, which he had considered for several years, of introducing the Angora goat into some part of the British Empire. The monopoly enjoyed by the Turk had been accompanied by neglect in the growth of the mohair, the hair varying widely in quality and condition, no care was taken in putting it up for shipment, and, it was reeking with disease germs. The probable cause of the failure to introduce the goat into South Africa in 1838, was the attempt to prevent crossing with the South African goat, and, as a consequence of inbreeding, the animals rapidly deteriorated. The goats introduced in 1856 were crossed with the Boer goat, which had become thoroughly acclimated. This method proved a complete success, and while the hair was not at first equal to the Turkish product, yet it has shown a steady improvement by reason of careful selection, until, at the present time the quality compares very favorably with the Turkish mohair.

The animals secured by crossing with the native goats were able to withstand the climate, and the flesh was better for food than that of either the Angora or the Boer animal. They have rapidly increased, and today South Africa is producing annually, mohair valued at nearly four million dollars.

Since 1856, the policy has been pursued of importing new blood, and three thousand Angora goats have been sent there since that time. Today, there are some very large flocks, one numbering 10,000 head. The animals do not thrive near the coast, but find the conditions most favorable in the interior, and while the climate is hotter than in Angora, it is also dryer, and dryness is an essential for the Angora goat. The long hair animals are kept in the open veldt, where there are few, if any, bushes, and the hair will not be torn off and lost; and the short hair goats are allowed to roam in the brush.

At night, they have to be kraaled, for protection from jackals, and the better managed ranches have well built sheds, in which the animals are housed for protection in cold weather.

The young goat is clipped for the first time when about six months old, and after that there are two clips per year. The first one comes in May, or June, just before winter sets in, and it is at this time that the fleece is longest and in best condition. By July, there is a length of one and a half inches grown out, which protects them from the cold weather. There is a second clip in September or October. This clip is naturally shorter, but it is necessary to shear at this time, as the hair begins to fall out in November. This second clip is worth only about one-half as much as the first.

The two clips are sometimes mixed together, and while the result is a very good grade of mohair, yet it is not the best, and this practice of mixing short and long mohair together has been the cause of bringing South American mohair into more or less disrepute. This evil has been so serious that the Mohair Breeders' Association was formed, and regulations have been es-

tablished, by which the members stamp the bags in which the mohair is packed, and guarantee the length of the staple.

The best fleeces come from the young animals. Shearing is continued until the goats are about six years old, when they are slaughtered for the flesh. The farmer does not make a practice of holding the mohair, but usually sells it at once to the traveling merchants. The price he receives is about one cent per lb. under the Port Elizabeth market, and about four cents less than the Bradford prices. These merchants who buy the mohair from the farmer, also deal in a general line of goods, and much of the mohair is paid for in goods, instead of cash. It is then taken to Port Elizabeth, where it is sold in the open market to Bradford merchants or speculators.

Mr. Schreiner stated that the government of the United States, some time ago, instructed the United States consul at Cape Town, to investigate Angora goat raising, with a view of shipping several thousand of the animals to the United States, to establish the industry here. This movement on the part of the pushing Yankee, caused so much alarm in South Africa, that the government immediately imposed an export duty of $500 per head on Angora goats. Mr. Schreiner expressed it as his personal opinion that this export duty was ill advised, and that it would not succeed in preventing the export of the animals, if the Americans wanted to establish them in their country.

He stated that the mohair trade was the only one that had increased in South Africa during the last few years, while sheep raising was very extensive, yet, there were less sheep there now, than in 1876. He said there were over three million Angora goats in South Africa today, and that the flocks were not subject to disease, and as a rule there is a good demand for both the mohair and the meat.

The Cape government encourages the business by distributing prizes for hair and for animals. High prices are paid for Turkish goats, for the purpose of crossing them with the South African animals. He stated that over $2,000 had been paid for one Turkish ram. He considered that today the best Cape mohair was equal to the Turkish. The farmers in South Africa are employing every means to bring the industry to a high degree of perfection. The African Angora Goat Breeders' Association keeps a careful record of pedigrees, and only the best are used for breeding. Shows are held all over the country, the principal one being held at Port Elizabeth.

In the early days, the farmers preferred an oily goat, but they have found since that the oily goats grow coarser hair, and today the animal that has less oil is preferred. He stated that, if mohair was raised in sufficient quantities, it would prove a strong competitor of wool, and that, with a larger product and more extensive use in manufacture, the price would not be subject to such wide fluctuations as at present. He said there were no Angora goats raised in the Transvaal, but they were confined to the midlands of Cape Colony. Pleuro-pneumonia had been stamped out in 1881, and anthrax was unknown.

These views of Mr. Schreiner's will be of interest to Americans, as various attempts have already been made to introduce the Angora goat into the United States. The first failures and final success, in introducing it into South Africa, should be a lesson to us. The question to be decided, is whether the climate of any part of the United States is suitable for this industry, and this can only be determined by systematic experiment backed by ample capital.

In the wide diversity of soil and climate in the United States, it would seem as if conditions existed under which the Angora goat would thrive.

The first attempts to introduce useful animals into a new country are usually expensive and unprofitable.

In this case, if successful, an industry amounting to millions of dollars per year would result. The general government should take charge of the experiments in such a case where success would be a benefit to the whole country.

We can draw a lesson from the alarm which, Mr. Schreiner states, was caused among our South African friends by our attempt to get hold of a few of their goats.

The material obstacle in the form of a $500 export duty may possibly be surmounted; then there is the Turkish source of supply. Turkey is owing us a little bill, that is now due, and, as she seems a little short of money, we might take it out in Angora goats.

Let the experiment of starting the growing of mohair in the United States be made at once, and thoroughly under government auspices.

MORE CONSERVATIVE.

Many textile manufacturers are experiencing more or less of the reaction, which exists today in nearly every branch of trade.

The revival of business last year, following the hard times, gave business men an experience with large orders ahead at fairly satisfactory prices, which they had not known for years. This prosperity caused a revival of hope, a feeling of exhilaration, probably far in excess of what the actual improvement warranted.

Prices advanced, and traders of all kinds, manufacturers, jobbers, retailers, became imbued with the idea that it was a good time to buy. Buy what? Why, buy anything,—wool, cotton, silk, leather, iron, steel, and they carried that idea into effect. This buying boomed prices still more, and the rise of values stimulated the feeling of confidence.

The merry work exhausted itself after a while, and for the last few months we have been returning to a healthy, normal condition. Prices have been on the decline, as they always are when buyers are few. The sentiment in all lines of business is becoming more conservative, and the question asked on all sides is: Where are we at?

The movement of merchandise towards the consumer has doubtless been largely in excess of the consumer's requirements. This movement stimulated by the sanguine sentiment which has surrounded us, acquired the great natural momentum which accompanies such conditions. Contracts are made for delivery far in the future, and today the jobber and retailer in most lines of business are finding themselves with large stocks purchased at advanced prices.

The consumer's purchases do not acquire the momentum which we see in movements of merchandise in bulk. Artificial sentiment has no effect on him. He buys only what he actually needs, and in many lines of goods he can, if prices are too high, stop purchasing instantly.

These seem like truisms, but they furnish, we think, the explanation of the timely and healthful business reaction which is now with us.

The present condition shows our large productive capacity, especially when the machinery is pushed.

Without the new mills, which are projected, we can supply our home demand, but there is the outlet which new foreign markets afford.

In textiles the development of foreign markets, as far as the great European nations are concerned, can safely be discarded in our calculations. These nations already produce far more than they consume, and are themselves fighting for outside markets. We will sell neither them nor their colonies much which they can produce themselves.

But we have South America and Asia, particularly China and the Philippines. Here are 400,000,000 yellow and brown men, whose wants are yet to be supplied. An inviting field for our manufacturers. But an outlet for goods in a new country with different

language and customs is not acquired easily. It is the result of patient, protracted, laborious effort and study of markets and people. It is slow work. It takes years, and the difficulty is greatly increased when, as is the case with us, the trade is already in the hands of other nations.

We don't wish to be understood as saying that the Asiatics are not to be good customers of ours sometime, but we want to call attention to actual conditions. According to the U. S. census report there was in operation in the United States in 1890, 14,550,223 cotton spindles, and in the same year we produced cotton cloths valued at $198,741,200, or at the rate of $13.60 per spindle.

Since then the capacity of the spindle has been greatly increased by improvements, but discarding this factor from our calculations, we find that the 1,390,884 new cotton spindles started in the U. S. in 1899 would even at the 1890 rate of production turn out goods to the value of $18,916,-022. This is nearly double the value of our exports of cotton goods to China in 1899, which was $9,844,565.

The increase of spindles goes on steadily. The increase for 1900 in the South alone has been estimated as high as 2,500,000 spindles. We find our mills able to supply the home demand easily, and the figures we have given indicate that we have discounted any probable immediate demand from abroad.

Under such conditions we can easily see our plain duty. Confine mill extension to actual demand for it, and continue constantly to perfect our machinery and methods, so that cost will go down as production goes up. More attention must be directed toward hunting up customers for our products.

The present reaction will be beneficial if it serves to give us a clearer view of actual conditions and the best course to pursue.

A Review of Industrial Progress, with Special Reference to its Bearing upon Cotton Manufacturing in this Country.

The following address of Pres. D. M. Thompson, at the annual meeting of the N. E. Cotton Manufacturers' Association, was intended to have been published in the last number of the Textile World, but was omitted through mistake. It is of such a comprehensive nature, and the facts grouped together are of so much interest and reference value that it can be read with interest and profit at any time, and we, therefore, publish it complete in this number.

Members of the New England Cotton Manufacturers Association:

Gentlemen: The pleasure of greeting you upon this occasion, as President of your Association, elected to fill the vacancy for the unexpired term of my lamented predecessor, is tinged with a feeling of sorrow for the loss of one whom we all so much honored and esteemed.

Frederick E. Clarke was a man of sterling worth and great nobility of character. He possessed a charming disposition, and his personal presence was an assurance of good cheer upon all occasions. All who have had the pleasure of his acquaintance were impressed with his strong personality. He was a natural leader, and his associations during life embraced a wide range of experience and useful work. His careful, conservative judgment, united with a vigorous and determined energy in the pursuit of objects he had approved, inspired a more than usual confidence. His untimely death has cast a shadow of deep gloom and sorrow over the city of Lawrence, where he had lived since early boyhood and was widely known and honored as one of its most noted citizens. To his family and wide circle of intimate friends it is a sad bereavement,—an irreparable loss.

In the presence of these conditions, it is proper to remark that we regard the Presidency of this Association as a position of distinguished honor. It is the evidence and expression of a confidence and esteem for which the recipient should feel a just pride and

gratitude. Therefore, it must ever be a pleasant memory to the family and friends of our late president and also to the members of this Association, that he was thus recognized and honored during his life.

In accepting for myself the honors and responsibilities of this position, I have expressed to your Board of Government my sincere thanks and appreciation of their confidence, and I re-affirm the same with much pleasure in your presence and to all the members of the Association here present.

Although for a considerable period a member of the Association, and conscious of the great value of its work, I have taken, like many others, but little part in its transactions, a circumstance which I now very much regret, and more specially since I am unprepared on account of the limited time at my disposal to present for your consideration the important questions such as I conceive appropriate for this occasion.

In the brief time at my command, I have examined into the general affairs and condition of the Association. It has been a service in which I have found pleasure, as I have hastily reviewed the records of the past and contemplated the great possibilities of the future. The history and growth of this Association, as of many other institutions and spheres of useful work, suggest that the founders have builded more wisely than they knew or were conscious of at the time of its inception. I am impressed with the great opportunity now at hand and the greater necessities than have heretofore existed for the exercise of such influence as this Association can now command.

This is the sixty-eighth meeting of the Association since its organization thirty-four years since. It is pleasing to note its growth and the rapid increase in membership during the past few years. The evidence of this is apparent in the transactions, in the larger volumes which record the increasing number of valuable papers presented, and the deep interest evinced in the more general discussion of them and of topical questions.

The principle and purpose of the Association are well established. It has taken a strong position and possesses the confidence of a large circle who find pleasure in attendance upon its sessions. The interest shown by the large increase of Associate members is a recognition of which the Association may feel justly proud. The Board of Government, its Secretary, and all who have been associated in the management, are entitled to great credit for their earnest efforts and wise administration.

This is especially true when we consider the limited means at their command. While the Board of Government have the power, they have never as yet made an assessment upon members of more than $5.00 per annum. The admission, regular annual dues, and the income of nearly $1000 from a number of advertisements, have barely sufficed for the work, to the present time. As the scope and importance of the work of the Association are steadily broadening, it is apparent there ought to be provided such income as shall insure the greatest possible efficiency.

The business of the Association has been administered with strictest economy, and a comparison of its transactions and meetings with other similar organizations discloses a most efficient and systematic condition. The transactions are records of great value to all interested in the textile arts, yet there is no index of the whole. It is desirable that a catalogue of the full series of sixty-eight volumes should be issued at an early date. The volumes back of No. 48 were destroyed by fire. There is a fair supply on hand of volumes since then, except of No. 56, which is reduced to three copies, on account of a valuable report of a committee on the costs of weaving. This volume is not large, and it is hoped it can be printed during the ensuing year. Owing to the limited income, the

transactions have been bound in pamphlet form, except a few volumes in cardboard covers. It is hoped the income may justify the better binding in the future and afford the management the necessary means for the accomplishment of other work of great value to the Association.

I venture to suggest that you will give to this matter careful consideration, since it involves a question of almost vital interest, to the end that sufficient means may be provided to meet the steadily increasing expenses and to accomplish such further objects as you may approve. It has seemed to the Board of Government a matter worthy of your attention.

You will find many Associations organized for similar work, whose annual dues are very much larger than is provided in the by-laws of this Association. When you reflect that under present conditions it is becoming known and recognized by large interests that the sphere of influence of this Association is rapidly extending, and its work has already become a factor of power, you will appreciate that there are responsibilities which must be met, and such as to justify your serious attention.

REPRESENTATIVE ASSEMBLIES.

The congregation in large assemblies of individuals, representative, through their intelligence and educa tion, of the best type of our civilization, is always an impressive sight. I am, however, impressed with a feeling that an audience composed of individuals representative of distinctive departments in the useful occupations of subdivisions of labor, such as bankers, merchants, engineers, or manufacturers, is even a more impressive one, for the reason that I am conscious of a presence which represents all that is known in that particular branch of science, art, or industry. I know of no department of industry wherein there exists a necessity for such gatherings or where there is to be found a higher order of intelligence and skill than in the arts of textile manufacture and in the management of the vast interests represented by the membership of this Association.

I have spent many years of labor in the various departments of this industry, yet, as I stand in your presence and look upon this assemblage, noting the sparkle and glitter of eyes beaming with an intelligence which signifies to me such a wonderful store of information and knowledge of the art, and conscious that collectively your experience is of incalculable value in every phase of the business which so deeply interests us all, I am profoundly impressed that our individual achievements are measureably limited and our experience is within comparatively narrow spheres.

IMPORTANCE OF THIS ASSOCIATION.

As I ponder upon and consider the trend of recent events and note the changing conditions of business methods, the necessities of a larger product, improved qualities and a steadily diminishing cost, conscious of the difficulties and obstructions which lie in our path, having also on view the developing tendency and movement toward concentration of interests, I am more than ever impressed with the importance of this Association and its possible influence in behalf of the cotton industry which can be made of incalculable value.

In this view, it is a matter of deep interest to all and especially within the United States, who are engaged in the manufacture of cotton, whether in the production of yarns, the textile fabrics, or the finishing thereof, that they should have representation in the membership of this Association. I believe this to be a question of such interest as to justify the earnest effort of all members in its promotion, and a provision, by the Association, of such means as will enable the Board of Government to properly execute the measures you may devise.

There are many events of recent occurrence involving important questions of world wide interest. As a

nation, a people or as individuals, we are impressed according to the point of view from which we look upon them or as we may fancy they affect our several interests. Yet, in the end, we shall probably be of one mind, for the forces which influence and will determine the result are in operation, and the conclusion, though disappointing for a time, will surely be right. This condition, though accepted as a fact, does not relieve personal responsibility, because all are contributory factors.

We may witness the course of one whose method, views or policy we may regret, yet it is not wasted; it has had its influence; strenuous and determined opposition may be wide of the truth and bereft of all honors, though its contributions may have proved of value, as in the economies of the forces and elements in nature there is nothing lost. The development of our civilization has proceeded along these lines. Every important event in the world's history, but more especially during the past five centuries, has been a contributing factor to the results which we now witness. There are but few who will seriously question the results which are today established conditions of human life, or doubt the wisdom of that power which directs and shapes the destinies of man.

As a nation we have occasion to be justly proud. Its progress and development have been marvelous. The character of its people, their vast wealth and illimitable resources constitute a record in history which may rival the tales of Arabian Nights when read or comprehended by peoples and nationalities which, until recently, were without this knowledge. We have far more than we may realize, for which we should be devoutly thankful. Our lots have been cast in pleasant places and embrace conditions, comforts and luxuries of living which a century since would have been impossible to imagine. It is scarcely credible that our modern industrial development is comprised within the brief period of 136 years.

EARLY INFLUENCES.

The discoveries of the fifteenth century by distinguished philosophers and physicists established the science of astronomy and the celestial mechanics. The discoveries of the weight of the atmosphere, and the natural laws of gravitation, of chemistry and its founding as a science, secured the most marvelous results, both in medicine and the arts, by the use of the simple materials and elements in nature. These and the influence of the fine arts of painting and sculpture of Greece and especially of Florence in the fifteenth century, were of incalculable value and constituted the foundations upon which the grand superstruction of modern civilization has been erected. We pass over the intervening period of gradual development and enter upon the seventh decade of the eighteenth century, a period which must be forever memorable as the birth era of our modern industrial life.

To the textile industry must be accorded early honors. The inventions which now appear so crude and simple, yet were such as enabled the spinning of yarns and the manufacture of fabrics by machinery. The improvements of the steam engine and the subsequent inventions which rendered its employment as a motor for the generation of power practicable, marked the entre into an era of such marvelous progress as to almost bewilder the mind in its contemplation. The genius of invention has passed the scope of ordinary knowledge, its almost infinite application to every condition and sphere of industrial activity and to every conceivable want or necessity of human life, whereby ten, a hundred, and even a thousand fold has been added to the former productions of human labor, is impossible to fully comprehend. The alarm and horror of the early times as to loss of occupations have long since ceased with the demon-

strations that these marvelous facilities are steadily and surely absorbed and appropriated to the advancement of labor and its elevation to planes of greater comfort and to the acquisitions of pleasure and luxuries before unknown.

The closing year of the nineteenth century is a peculiarly appropriate time, and the present a fitting occasion, for brief reference to a few events and conditions in the past which indicate the course of industrial progress. Investigation will disclose a wonderful picture, a panoramic review of causes and their effects, and an exhibition of the steady and increasing effort of human nature. Its careful study is an inspiration. I will note but a few points suggestive of the spirit of the people, their methods and habit of concealment, customs which were so crystallized into their system and practice as to require a long period after the enactment of the patent laws for the removal. The artist, mechanic, or manufacturer who may have discovered something new was sure to conceal it from the world, generally preferring this method for the protection of his interests. He would exhibit his products, but permitted no person to witness his process or methods. Gradually but slowly, more enlightened and liberal views were developed as a result of and co-incident with a broadening spirit.

Toward the close of the eighteenth century, local exhibitions were inaugurated. Their value was promptly recognized. The impulse thus given met with quick response in the formation of County and Borough Associations. They were taken up by the people of France, greatly assisted and encouraged by the first Consul. The spirit extended through western Europe, until public sentiment, enlisting government support and co-operation, they became national. In 1849, liberal leaders in France proposed an international exhibition, but it was promptly suppressed by the influence of a majority of the Chambers of Commerce throughout the empire insisting that such a proposition must have emanated from the enemies of French industry. The seed, however, had been planted; though of slow growth it was sure to develop; a harvest was even then in sight. Influences, such as the Society of Arts in London, were of incalculable value and resulted in the first international exhibition held in London at the Crystal Palace, in 1851.

Viewed from the point of the then existing conditions, it was a marvelous success, a wonder of the age. This incident marked the second epoch of industrial development. As compared with subsequent expositions, it was limited, and in a measure primitive; yet it was a grand modern incubator; the shell and crust of pessimism and the prejudices of the past were broken, and there emerged a vital force, a living spirit, which spread its wings in the clear atmosphere of a brilliant sky. Its course has since been steadily onward and upward, reaching out into the utmost parts of the earth, and destined in the near future to lift from barbarism a thousand millions of people into the blessings of a civilization we now enjoy. The varied evolutions of this development must impress all who will give it close attention that there are responsibilities which we are bound to respect.

MARVELOUS DEVELOPMENT.

In further illustration of the purpose I have in view, I invite your consideration of the work of George Stephenson in his perfection of the traveling engine or locomotive started by Trovethick. It represents a service rendered to mankind scarcely less important than that by Watts. On July 25, 1814, fifty years after the invention by Hargrave of the spinning jenny of eight spindles, Stephenson's first engine, "My Lord," built for a coal tramway, was started and proved successful upon its first trial.

The Stockton and Darlington Rail-

way was projected for the transportation of merchandise by the use of horses. Stephenson was subsequently employed in its building. It was the first railway over which merchandise was ever transported by steam power. It opened for operation September 27, 1825. The engine "Rocket," made a trial speed of twenty-nine miles per hour, and with thirty-six carriages and a load of ninety tons, a speed of about six miles per hour. This led to Stephenson's employment as engineer to build the Liverpool and Manchester railroad of thirty-one and one-half miles, which was opened for the transportation of merchandise in 1829 and shortly after for public travel.

Prior to this period, the transportation was through canals, of which there were three. Owing to the crowded traffic it required usually a month for the transportation of cotton from the seaport at Liverpool; the water course of but fifty miles required thirty-six hours in actual transit, and a cost for general merchandise of 18s., or $4.50 per ton. The railway transportation reduced rates from 5d. to 1-5 of a penny per mile per ton. The price of coal at Darlington was reduced from 18s. to 8s. 6d. per ton.

In the short period of fifty-seven years after the inauguration of the first railway, the Manchester and Liverpool railroad formed part of a system owned and operated by one company representing a capital of £100,000,000. Can you realize the import of all this, or that it is but seventy-one years to the present time?

What do you think would have been the judgment of the people present upon that distant occasion, if a speaker had attempted to describe or picture to them the conditions which would obtain in the closing year of the nineteenth century?

Railroads.

In this brief period the world has acquired 444,200 miles of railroads, of which Europe has 36½ per cent. of the mileage, Africa 2 per cent., Asia 6 per cent., Australia 3 per cent. and the United States 52½ per cent. or 184,194 miles and 60,340 miles of side track. Its equipment comprises 36,746 locomotives and a total of 1,318,700 cars, representing a capital stock and bonded debt of $11,217,158,452.

Since 1825 there have been built in the United States 34 commercial canals at a cost of $194,105,000. (The Suez Canal cost $102,750,000.)

The world has today 323 lines of submarine cables comprising 151,067 nautical miles.

Telegraph.

The Western Union Telegraph Company have 189,856 miles of poles and cables, and 904,633 miles of wire and transmitted in 1899, 61,398,157 messages at an average cost of 25.1 cents, being less than one-fourth the cost in 1865.

The Postal Telegraph furnish no records.

Telephones.

The American Bell Telephone Company have a total of 1,518,609 miles of wire, of which there are 489,250 miles of wire underground.

There are 1,580,101 instruments and a daily average of 5,306,687 exchange messages.

The Company have a capital stock of $25,886,300.

The Long Distance have 150,380 miles of wire.

Germany with a population of 52,279,901 has 173,981 telephone stations.

France with a population of 38,518,975 has 45,000 telephone stations.

Great Britain with a population of 37,783,000 has 103,275 telephone stations.

United States with a population of 78,500,000 has 632,946 telephone stations. A number equal to the whole of Continental Europe with its population of about 475,000,000.

Electrical Development.

The capital invested in Electrical industries is $3,260,000,000. It is estimated that a capital of $1,000,000,000 is invested in electric lighting plants.

There are 950 electric railroads with an investment of $1,700,000,000.

Electric Power Transmission has now become generally recognized. Its successful operation is well established as in the case of Niagara Falls and other points where power is transmitted over long distances. This will lead to the development of many large water powers which would be otherwise unavailable because of location and physical condition.

Considerable interest is now manifest in its application to textile mill equipment. The system is especially applicable in the reorganization of power plants having several units and for purposes of concentration and better distribution.

The first application of this was a single phase motor of 50 H. P. installed in 1890. At the present time there are several plants in operation comprising over 16,000 H. P. and nearly 30,000 H. P. is under contract and in process of construction.

The progress in this department of industry is marvelous and when we recall that it is all comprised in a period of but little over 20 years, it is almost overwhelming to contemplate.

Imports and Exports.

The imports into the United States for year ending June 30, 1899, $697,148,489.

The exports from the United States for year ending June 30, 1899, were $1,203,931,222, of which amount $338,000,000 were manufactured products.

Savings Banks—United States.

Exhibit deposits, in 1899, of.....$2,230,366.93
Number of depositors.....5,687,818

Showing an average deposit of nearly $400.

The above is exclusive of commercial banks. It is a wonderful exhibition and deserving of careful consideration, in connection with very important questions now engaging the public attention.

Europe.

Saving deposits in all European countries $4,593,940,450
Number of depositors.....48,687,818

Average of deposits, $94.35; or less than one-fourth of that of the United States.

LESSONS OF THE PAST.

These citations are a very few from the vast store of information relating to the production of labor, but will suffice to call our attention to questions, the importance of which can not be overestimated. Occasionally we meet persons who seem indifferent or unable to appreciate the forces which have wrought this marvelous progress. They will generally look closely to their own affairs, feeling a sort of confidence that all will be well, and that the general results are shaped and predetermined by the natural laws of trade. Such a view is, in many respects, an error. We cannot reap that which we have not sown. Thistles and underbrush may thrive without our aid, but a harvest of valuable cereals requires that the grounds shall be properly prepared to receive the seed. In the operation of mills, we know that more is required than simply putting the machinery in motion. Primal causes are coincident with and find expression in human effort. The results are determined by the exercise of intelligence and skill, guided by experience. This general principle is alike applicable to the collective affairs of communities or a nation, as to the interests of the individual, since all are interdependent.

The events of the past are matters of indisputable record, and their results may be accepted as safe guides for the future. In the light of such an experience, it would seem as if there can be little doubt in the selection of our course. Unless, however, we are constantly on the alert, there is grave danger that we may err in respect to our judgment, and, as those who have preceded us, move more slowly than we ought. "Eternal vigilance" is the watchward of the hour. It is not alone the price of liberty: It is the determining factor in all business operations. The marvelous achievement of the past is an

inspiration for the future, and justifies the largest measure of effort. If properly directed, the results aimed at are sure of attainment, and the compensation will reward the highest ambition. Among the problems we are called upon to consider in our business affairs, there are thoroughly practicable propositions simple in their conception but oftentimes difficult in their solution or execution.

Conditions confront us, at the present time, of such grave import as to justify the exercise of every means in our power, to the end that many weak points in our industrial systems may be strengthened and improved, and insure every possible measure of permanence and safety for the future. In the attainment of many of these objects, it is indispensable that there shall be concentration of effort. There are factors involved which lie beyond the power of individual labor or experience. Their solution or advancement into planes of greater value to all concerned, demands a union of interest. This principle is now in progress; results are already secured which justify the proposition that "In Union there is strength." Analyzed, and specifically expressed, it implies a power and force ten-fold greater than is possible to individual effort on the basis of equal numbers. The ties which bind men together through mutual compacts designed for the protection of life and property, and exercised through the functions of government, insure a strength of almost inconceivable power: the reverse means anarchy and ruin.

BUSINESS CONDITIONS.

The present conditions of business are such as to justify congratulations. Its activities are a welcome sight to a people who have suffered and struggled for existence through a long period of financial disaster, of such exceptional severity as to imperil vested interests and long established industries. The records of human suffering, and the wreck of fortunes; the suspension of useful occupations and the curtailment of production; the exhaustion of the resources and savings of labor, and its non-employment, are the memories of a past which we would fain forget. On the contrary, we shall for a long time remember it as a period during which vital and severe conditions, rather than theories, confronted us. From a condition of prosperity in 1892, when both labor and capital were profitably employed, we were, by an Act of Congress, repealing tariff laws, thrust into the depths of a dark chasm of despair and industrial ruin The losses, including suspended production, amounted to thousands of millions of dollars. If it shall prove that we are able to avail of the experiences which necessity then imposed, we shall, in the future, recoup, as a people, much of the sacrifice then endured. It is gratifying to note that there are evidences of such a spirit.

It is possible, that at some period of the future, we may look upon the recent misfortunes with more of charity toward their projectors than has been possible in the past; since we must recognize that the necessities of the times have compelled the adoption of methods and business policies which give promise of great benefit in the future. It was under such conditions of dire necessity, that the public spirit which we now witness came into being as a vital living force. Its mission is one of incomparable value, and the logical conclusion of its achievement will mark the close of the nineteenth century as an era long to be remembered as the third epoch in the history of modern industrial development, in regard to which the honors will be distinctively American. Herein is the manifestation of a spirit and purpose which gives promise of a future for American interests such as we have not known in the past. It suggests to the genius of American invention and enterprise, an opportunity for which it has long waited; and its utilization will prove of deep-

est interest to American labor and American capital. It is in behalf of this liberal thought and broad public spirit—a potential force of resistless power—that I plead for your support.

ILLUSTRATIONS OF ORGANIZATION.

In this connection, I suggest the "Philadelphia Commercial Museum" as a fitting illustration of the value of organization. Conceived during the Columbian Exposition, it is but six years since its founding. Many of you are familiar with its operation. Its achievements to the present time are of incalculable value. Its collections of samples, of raw materials and the products of industry, from all parts of the world, constitute an almost priceless treasure. The information already acquired, its collation and the channels established for its distribution, are such as one unacquainted with its operation can scarcely conceive. Its value is well established and it is destined to become a storehouse of knowledge and a repository of information such as the world has not yet possessed. Independent of all its work to the present time, it has rendered a service of immeasurable value in its influence upon the minds of men who are indispensable in the promotion and accomplishment of important operations.

Another example worthy of notice, and of the highest appreciation is the "National Association of Manufacturers." This Association is now holding its Fifth Annual Convention, and within the same building in which we are now in session. It has a membership of nearly two thousand representative men who are leaders in widely diversified industries. The value of its services already rendered to American industry and its commercial interests are incomputable. Its influence is a vast and potent force in shaping commercial policies and in the promotion of a foreign trade. The course it is pursuing and the deep interest of its members are an assurance of marvelous achievement in the future.

When you consider that during the present week, there are other important associations, viz.: The Woolen Association of Manufacturers, the Shoe and Leather Association, and the Paper and Pulp Association, making in all five organizations now holding their annual conventions in the city of Boston, it is suggestive of a condition which promises wonderful advances.

IMPORTANCE OF EXPORT TRADE.

I am so deeply impressed with the manufacturing and trade conditions of America especially during the last decade, that I am unable to refrain from the most urgent presentation. As I have before and repeatedly remarked, I am convinced, beyond the question of a doubt, that we are upon the threshold of a possible revolution of former business methods. I feel assured that almost within our grasp are opportunities such as but a few years since were scarcely believed possible. The marvelous advances in many leading American industries justify the desire and early expectation of a large export of manufactured products. The facilities for American productions have advanced so rapidly as to render the acquisition of foreign markets a vital necessity. Heretofore a general feeling existed that such a condition was impossible except through a removal of tariffs, and the placing of American labor upon the level of European conditions. We have had sufficient of that experience. We believe, as never before, in the protection of American labor, and in such wise adjustment of tariff as will insure the protection of all industries so long, and to such extent, as protection may be necessary. Our present conditions have been created only through the system adopted of protection. There are many of our products which can be exported subject to proper influence that will insure not only permanent employment of present labor, but which will permit of large extension of present manufacturing plants.

While this Association must be restricted in its specific operations to the cotton manufacturing industry, yet its influence can easily be made a factor of great value in the promotion of general interests, such as that which in turn we ourselves receive from others. Hence, the justification of co-operation. Owing to our past experience, a feeling exists that overproduction is an imminent peril, a source of constant danger. This fear we may accept as our justification, and it is a sufficient reason to encourage every effort within the power of all who have interests at stake, to procure the most favorable conditions for the export of cotton manufactures at the earliest possible time. The ends justify the means and both are within your reach.

Value of the textile products of the United States in 1890 was.....$683,064,000
The woolen industry represented.....19%
The worsted industry represented....10%
The silk industry represented.....12%
The carpet industry represented..... 7%
The hosiery and knitting nearly.....10%
The cotton industry represented.....42%

COTTON CROP OF THE UNITED STATES.

Cotton crop in 1829.....bales 870,415
Cotton crop in 1899 11,235,383
Cotton consumption in 1886-87.... 1,938,000
Cotton consumption in 1898-99.... 3,553,000
An increase of 66%.
The cotton spindles in the world, about 105,000,000.
The cotton spindles of Great Britain, nearly 44%.
The cotton spindles of United States, about 19%.
The cotton spindles of the Continent 32%.
The cotton spindles of the East Indies 5%.

In 1898 there were 19,410,554 cotton spindles and 453,281 looms in the United States.

For the year ending June 30, 1899, the value of the world's export trade in manufactures of cotton was $500,618,412, distributed as follows:

United States	$ 23,566,914
England	328,325,157
Germany	53,637,776
France	32,081,095
Austria-Hungary	4,142,910
Italy	10,747,854
Russia, estimated	1,500,000
Switzerland, estimated	25,000,000
Belgium	5,440,746
Japan	16,215,960

While the exhibit of the United States is not flattering, it emphasizes the importance of the plans suggested as means of relief.

The total value of American exports of domestic manufactures for the same period $338,675,558.
The farm value of the American Cotton Crop, $260,223,000.
The total value of American exports of domestic merchandise, $1,206,931,222.
The value of American manufactures of Cotton:
1895. Total exports $13,789,810
1895. Exports to China 1,723,394
1899. Exports to China 9,844,563
Cotton goods imported into Shanghai in 1898 was..... 38,500,000
From the United States 5,203,427
While Great Britain secured 23,500,000

EXHIBIT OF THE DISTRIBUTION OF THE EXPORT OF COTTON MANUFACTURES FROM THE UNITED STATES IN 1899.

Germany	$ 232,411
All other Europe	359,601
Central America States	737,259
British West Indies	465,540
Hayti	509,597
Brazil	587,202
Colombia	439,136
Venezuela	601,609
China	9,844,565
Turkey in Asia	130,532
Hawaiian Islands	464,925
Africa	516,193
United Kingdom	892,351
British North America	2,759,164
Mexico	883,531
Cuba and Porto Rico	757,739
Other West Indies	290,385
Chili	499,318
Peru	132,625
Other South America	494,079
British East Indies	268,791
British Australasia	414,164
Other Asia and Oceanica	1,217,107
All other countries	109,092
A total of	$23,566,914

The above is a very brief statement of a few important features of cotton manufactured products, and their distribution in export. They are suggestive of conditions requiring the serious attention of Americans. There is much other information which indicates the promise of a valuable trade with the Hawaiian Islands, the Philippines and Porto Rico. When we consider the changed conditions which have obtained during the past two years, there is occasion for universal rejoicing. The present policy of the general government affords means for important and essential service in aid of an export trade, which was formerly wanting, and for a time seemed impossible to obtain. The question also involves a consideration of the important recent events

in our National affairs, and the issues are of the deepest interest to the American people.

AMERICA A WORLD POWER.

Time and space forbid me more than a brief allusion, and only as it suggests relevant matter suited to the subject I have in mind. The Hispano-American War was not of American origin. Its horrors and calamities cannot be charged to American influence, or to an imperialistic tendency and desire of our people for extension. All influence within the power of our government was exercised with the desire to avert the sad disaster. Forced upon us through circumstances beyond our control, and under conditions which touched our National honor, the issue was accepted. The struggle was incisive and brief; the significance of its results cannot be for more than a brief time misunderstood. National honor has been vindicated; American interests and the character of the American people, their versatility and marvelous resources, which constitute their great power, have become a factor in the world's affairs, and their exercise will contribute to the advancement of civilization. Millions of people now in semi-barbarism will yet hail this event as a trumpet call for freedom,—a liberation from the bondage of ignorance and superstition,—and generations yet unborn will in the future give praise and thanks to the God of their fathers for His interposition of American power in their behalf.

I believe the time is not far in the future, when all Americans, independent of party considerations, will recognize the incalculable benefits which have been secured in this recent disposition, and will acknowledge the guiding influence, wisdom and power of that Divine Providence which directs the destinies of nations.

Our national growth and industrial development have moved forward so steadily, to the present time, crystallizing their forces into the very life of all useful occupations, that it is not strange that we accept the results in a sort of passive and unsentimental spirit. It is only when we permit or compel our minds a brief rest, and in a reflective mood turn backward and look into the records of the past, recognizing that each and every event and evolution have been contributing forces, that we are able to fairly and without prejudice judge of the present, or wisely speculate as to the future.

As I review the past, it seems to me as almost incredible, that it is only since 1792 that Samuel Slater built the first American cotton mill, at Pawtucket, R. I. How simple are the problems of engineering, equipment and operation, today, as compared with Slater's time, when every scrap of information was concealed, and such embargoes and restrictions imposed as to make it a crime punishable with severe penalty for any one who should attempt to supply plans, or in any way furnish information to foreign interests touching the art of cotton spinning.

LABOR CONDITIONS.

The history of industrial progress records no greater achievements than are to be found within the sphere of your vocations. You may there witness nearly every phase in the social life of the laboring class. A higher average of intelligence and skill, or more comfortable conditions of living and its attendant pleasures are rarely found than among the artisans and employees engaged in the manufacture of the textile fabrics.

The deposits in our savings banks exhibit evidence of their frugality and thrift. A general condition of common interest is found in all of the useful occupations. A comparison of the present with earlier times affords convincing testimony that relative conditions of living are practically unchanged, the labors of all are subject to one general law and principle in the distribution of wealth, and that all classes are advanced to

higher planes. There are, however, mischievous and disturbing influences in operation which point to much serious trouble in the future. I believe this is a question of grave import to all interests. It should be given early and careful attention.

The members of this Association have had invaluable experience, and I know of no subject more worthy of your attention. The financial interests you represent have very much at stake and are entitled to every protection which can be devised. The outside demands for the reduction of the hours of labor from ten to eight is unreasonable and in utter disregard of economic considerations. There can be no question that the hours of labor will, in the future, be reduced as a natural result of the facilities for production, but changes should be gradual so as to avoid serious disturbance, the sure penalty of error.

ASSOCIATION DISCUSSIONS.

I trust that you will not understand me as suggesting in the slightest degree an abandonment of your past practice or policy in the treatment of technical questions. I recognize their importance and hope to witness even greater interest. In this connection, I beg to suggest and urge a more general participation in discussions than heretofore. If we would attain the benefits possible to the Association, all must contribute some measure of their knowledge and experience. I am as well aware as any of you of the difficulties of speaking in public, and with what ease one's thoughts take wings and fly away. The only possible remedy for this, that I can suggest, is that we must all become better acquainted with each other and feel that each has the other's confidence. There is, in this membership, as I have before remarked, a store or reservoir of knowledge which is invaluable. It is but just and fair to all that it shall, in some way, become available for useful work.

I have, possibly, presumed too much upon the privileges of position and occasion; if so, my only defense is an earnest desire to contribute some thought, feeling, or suggestion which your intelligence will turn to practical account. I have chosen to deal with what, in the main, I conceive to be the fundamental and governing principles which underlie all human effort, rather than to discuss at this time concrete questions in the technics of our Art.

SECTIONAL INTERESTS.

There is one which I will invite you to consider at your convenience. It is the question of Northern and Southern interests engaged in the manufacture of cotton products. What are their present relative conditions? To what extent is the Southern a menacing factor to Northern interests? If such difference exists as by some supposed, then is there a remedy which can be applied without injury or prejudice to either, which shall establish an equilibrium?

We have a large representation in our Association of members who represent Southern interests. I have the pleasure of a considerable acquaintance among them, and, I trust, their confidence to such extent as to relieve me from any feeling, on their part, that I am presenting a question in a spirit of rivalry, or which shall, by any means, induce that spirit. On the contrary, I believe it is of the highest interests to both sections that this question shall receive calm and deliberate consideration, to the end that a true knowledge of the condition may be secured, in the interest of all concerned.

During the period of recent depression, it became a question of grave concern to Northern manufacturers. Southern mills were selling their products at prices which the Northern mills could not meet without loss. This experience naturally produced a very depressing effect, which has lingered even since the change of commercial conditions. It is a matter of general knowledge that preparations and work are now in hand which will

add, during another year, nearly 2,000,000 of spindles to Southern production, while, in the North, but little is being done other than in the increase of product which will result from renewals of machinery. There is a fear, on the part of some persons, that the present policy of non-extension may be continued for an indefinite time. If the present movements upon both sides are long continued, then both the conditions and results are for a time as effective as if the claims of many Southern interests, as to ultimate control, were really true. This judgment is, I believe, in error.

The natural advantage possessed by Southern over Northern mills is by no means a menacing or a seriously disturbing factor, as it does not exceed 4 per cent. The total differenc, upon the basis of equal conditions of plant, will vary from 15 to even 20 per cent. Now, it must be apparent that if the natural advantage does not exceed 4 per cent. then all other differences must be abnormal. They are due to the less cost of labor, and the larger number of hours of running time. This condition cannot long endure and will gradually disappear with the exhaustion of labor, improving conditions of operatives and reduction of running time. It is a question of interest to both sections that the truth shall be known, because there are other interests involved, which are vital and require co-operation.

The conditions I have at first indicated as likely to obtain in the near future, are such as will justify a very much larger increase in the number of spindles and production than is generally believed. It is for the interests of all sections that the distribution of this growth shall be made upon just and equitable lines. This will give to the South the coarse goods and low grade fabrics of medium counts, and to the North the high grade fabrics of medium counts and the fine yarns and fabrics. I think this indicates a reasonable condition and an equitable division, a predic tion that I made twenty-two years ago, and before either section had given the matter more than general attention.

SUGGESTIVE.

When you reflect upon the marvelous progress in all lines of useful work, as indicated by the very limited statistics quoted, we are astounded by its grandeur and magnitude. What would have been the general opinion of one who had, twenty-five years since, predicted that Great Britain, in 1900, would place a single order for 2,000,000 tons of coal, with one of the Alabama coal mines delivered f. o. b. ship, at New Orleans, at a minimum cost of $1.50 per ton? Equally impressive would have been the prediction that at this period the United States would lead the world in the production of pig, refined iron and steel. These are suggestive of many other achievements. In view of the overwhelming evidence which surrounds us on every side, we must accept the proposition that products of invention and improvement are now multiplying more rapidly than at any previous stage in the world's history.

CONCLUSION.

Thus the spheres of human activities are steadily multiplying. Forces of nature are responding to man's discoveries, as, in a steady procession, they move forward to the accomplishment of some grand purpose which, until recently, was unknown. Achievements in Science, which seem as the visions of a dream, beckon us onward, inspiring a spirit of ambition and ceaseless effort in further investigation. We are overwhelmed in wonder and amazement, as we try to forecast the possibilities of the future. Speculation and experiment have passed to a point where experience has demonstrated the possibility of constantly changing conditions. Improvements, and the advance toward higher planes of social life are as wonderful, in their ever changing forms, as the marvelous imagery of

the Kaleidoscope. Each step forward simply discloses to our vision the illimitable and unexplored space, which neither Science, Art, nor any instrument of man's discovery has yet been able to fathom. Benefactions such as have been bequeathed to humanity by distinguished philosophers, physicists, and the notable inventors of more recent times, will pass on as a heritage for all of the generations that come after—an inspiration which will thrill the hearts and quicken the nobler impulses of human life, uniting the best thoughts and activities for the advancement of the public weal and the establishment of peaceful relations and good-will among men.

CALCULATING EFFICIENCY OF LOOMS.

Many mills calculate each week the percentage of efficiency of the looms, as this is the only way by which one can know how well the looms have been running. The average number of picks per inch in the weekly product is obtained from the mill records. Then a calculation is made, to show how many yards would be produced if the looms had run constantly. The proportion which the actual yardage bears to this theoretical yardage is the percentage of efficiency. This calculation involves considerable labor. It is the only means by which loom product can be fairly measured in a mill, where picks per inch vary from week to week. The following short method for making this calculation has been devised by a manufacturer:

The cuts, as they are measured, are entered on the mill books in the usual way with the picks per inch opposite each cut. At the end of the week these figures, representing the picks per inch, are added together, and this amount is divided by the number of cuts. This gives the average picks per inch for the entire product. This average is multiplied by the number of yards woven, and the product is divided by a number which we call the "constant." The result is the percentage of efficiency. This constant is determined by the number and speed of the looms and the running time as follows: The number of looms is multiplied by the picks per minute; this result is multiplied by the number of minutes running time per week; this is divided by 36, which gives you the "constant" for your looms.

This may seem complicated, but it only seems so. The "constant" is the same, as long as you do not change the number, or speed, or running time of your looms, and by means of it the overseer of weaving can easily learn at the end of each week the efficiency of his room.

EGYPTIAN COTTON IN THE UNITED STATES.

The botany division of the Department of Agriculture, Washington, has given much attention in aiding the cultivation of cotton from Egyptian seed in the United States, but with indifferent encouragement as to profitable results. So far as recent experiments in this respect are concerned, the Textile World has given more consideration to the subject than any other publication.

The following are chiefly the views and results of the investigations of L. H. Dewey, assistant botanist of the Department of Agriculture.

Egyptian cotton forms one of the most important items among the fibre materials imported into this country. In length of staple it is between the average upland and the sea island cotton. It is fine, but its particular value lies in its superior strength and elasticity, and in its remarkable development of twist, enabling it to cling together and make a very strong, fine yarn. When obtained in good condition it has a fine lustre and is soft and oily to the touch. It is not handled well by the same machinery used for preparing and spinning upland cotton, and as it is used in the production of a quality of fabric not made from either upland or sea island cotton, it does

not compete directly with them. It is used chiefly, either combed or carded, for the production of fine yarns. These yarns are used in the better qualities of hosiery and knit goods and for mixing with silk and wool. It is also used in making fine thread for laces.

The direct importations of Egyptian cotton increased from less than 200,000 pounds in 1884 to more than 43,000,000 pounds in 1896. Since the latter date the importations have fallen off somewhat. This decline, however, must be ascribed to small crops in Egypt rather than to lack of demand. While there was a decline in the average prices during 1898 and the first part of 1899, there has been a decided upward tendency since then.

Considerable amounts of Egyptian cotton are undoubtedly imported through other countries, and the prices in this country range higher than do those at the foreign ports of shipment. The requirements of the growing knit-goods industry and the demand for a quality of goods that can be made only from Egyptian cotton seems likely to maintain or even increase the demand for this fibre. The area supposed to be adapted to the cultivation of this cotton in this country is comparatively small, and there is apparently little danger of overproduction from other sources. It is cultivated in Egypt only in the Nile Delta, an area comprising altogether less than 10,000 square miles of arable land, or about one-third the area of South Carolina.

The first records of attempts to cultivate Egyptian cotton in the United States seem to be the reports of trials with seed imported and distributed by the Department of Agriculture in 1867. The reports of the Department for 1867 and 1871 contain the results of more than fifty trials made in all the States from North Carolina to Texas and Alabama. The cotton proved generally unsatisfactory, except in one or two instances in southern Louisiana. It was found to be drought-resistant, and in cases where mature fibre was obtained it was generally regarded as of superior quality. It required too long a season from seeding to maturity to permit its successful cultivation except in the extreme southern parts of the area. In many instances the plants grew large, and they were generally more free from attacks of insects or fungous diseases than upland cottons growing in the same regions. The bolls were mostly 3-locked, always small, and often few in number. Many of the bolls produced failed to mature before frost, so that the yield of fibre obtained did not average much more than one-third of the yield obtained from upland cottons. The most favorable reports were from southern Louisiana. There were no reports from southern Texas, and the single report from Florida was indefinite.

The reports of the failures in 1871 appear to have discouraged further attempts at the introduction of Egyptian cotton during the succeeding twenty years. Some seeds have doubtless been brought from Egypt by private parties, but they have evidently not succeeded well, as nothing has been heard from them.

During the years 1892 to 1894 the Department of Agriculture imported and distributed three varieties of Egyptian cotton seed, viz, Mitafifi, Bamia, and Abbasi. Seeds were sent to all of the cotton-growing States, where they were tested at the State Experiment Stations, and also on the plantations of several cotton growers. The reports received indicate failure in nearly all cases. Most of the men who tried the seed were so discouraged by the small yield of the first crop that they did not save seed to make any further trials. In most cases further trials would doubtless have resulted in a waste of time, but in the Gulf region, where the seasons are long, it is probable that better results could have been obtained from seed grown for two or three generations in this country. Experi-

ments with imported cotton seed in this country and with American cotton seed in Egypt prove that larger yields may be expected after the plants become acclimated. The causes of failure were chiefly a too short season, except in the warmer part of the cotton belt, and seed not yet acclimated.

In San Patricio County, in southern Texas, W. H. Wentworth sowed 1½ acres each of Bamia and Mitafifi. (See June and July, 1899, issues of the Textile World for illustrations and a more analytical account of what Mr. Wentworth has been doing.) He obtained from the first seeding only 75 pounds of seed cotton from the 3 acres, but he observed that the fibre was of superior quality and the plants were strong and healthy. Seeds were saved from selected bolls from the best plants and planted the following and each succeeding year. The plants became more prolific as they were thus acclimated and carefully selected. It was found necessary to keep the cotton closely picked, as exposure to the weather in the open bolls destroys the peculiar lustre and the oily feeling, which are regarded as very desirable in the best quality. It was also found necessary to gin the fibre with a roller gin to obtain the full length of the staple. When carefully handled, picked as soon as mature, free from dirt, pieces of leaves, or "squares," and properly ginned on a roller gin giving a long, even staple, free from seed hulls, Egyptian cotton grown in Texas appears to be fully equal to the imported fibre. A sample of cotton of the crop of 1899, sixth generation, grown in Texas, has been pronounced by some of the most extensive importers of Egyptian cotton in this country to be of superior quality. No spinning tests have yet been recorded.

In 1895 Mr. Wentworth cross-pollinated Mitafifi Egyptian cotton with Myers' Big Boll, a Texan variety, and has carefully selected seeds from the best plants resulting from the hybrid thus obtained. This hybrid cotton produces a fibre almost like the Egyptian, and in some respects is superior to the Egyptian. The bolls, although usually 3-locked, are generally larger than those of the Mitafifi, and the plants are more prolific and earlier maturing.

Mitafifi: The best known variety and, the one most extensively grown in Egypt is Mitafifi. This is commonly regarded as the standard variety in Egypt, and its fibre is most frequently quoted in the market reports in this country. It is one of the most hardy varieties, withstanding a comparatively wide range of climatic conditions. The Egyptian cottons as a rule are very sensitive to cold or excessive moisture. It attains a height of 4 to 7 feet, with numerous spreading branches. As it is generally larger than American upland varieties, it requires more room for development. It has rather small, round bolls, in which the cotton remains compact after the bolls are open. Its yield in Egypt under average conditions is 500 to 600 pounds of lint per acre, the lint being about 34 per cent. of the seed cotton. The fibre is of a yellowish-brown color, fine, strong, soft, oily, and lustrous. The seeds are nearly smooth and black, with small tufts of green fibre at the ends, and are easily separated in ginning.

Bamia: Next to Mitafifi, Bamia is one of the most extensively cultivated varieties. It attains a height of 6 to 8 feet, with coarse, stout stalks, but with few or no branches. The bolls are borne in clusters on short spurs similar to those of the cluster type. It may be grown somewhat closer together than Mitafifi, but it requires more water. The lint is brown, similar to that of Mitafifi, but usually classed a little lower in market quotations. The seeds are smooth, of a light coffee color, and somewhat larger than those of Mitafifi. The yield of lint is about 32 per cent. of the seed cotton. The yield per acre under average conditions is nearly as

much as that of Mitafifi.

Abbasi: In certain favorable localities Abbasi is regarded as the best variety, and where it is obtained at its best the fibre from the first two pickings of this variety usually brings the highest market price. It grows best on loamy soil. Its seed should be in the ground early in March, and it requires warm and rather dry weather during October and November to properly mature a complete crop. The Abbasi plant is similar to that of Mitafifi, from which it is derived through Zafiri, a variety now little cultivated, but it is generally smaller, with a more open, spreading habit and fewer branches. Its small bolls are very sharp-pointed. The seed is smaller than that of Mitafifi, somewhat reddish, and with very little adherent fibre. The yield of fibre is 34 per cent. of the seed cotton. It is snow white, fine, silky, but not as strong as Mitafifi, and generally lacks the soft, oily feeling of the brown cottons.

Janovitch: This variety, originated as a sport from Abbasi, was first brought to notice in 1897. It is therefore not much grown as yet, but it is asserted to be by all means the finest cotton of the white, long-staple class ever produced in Egypt. The fibre is nearly equal to Sea Island in length, snow white, of a remarkably fine, silky texture, and has the characteristic twist well developed. This variety is now being introduced into America for the first time, a considerable quantity of seed having been secured for the Department of Agriculture through the efforts of Hon. Barbour Lathrop and D. G. Fairchild.

The following varieties are grown to a less extent in Egypt, and their cultivation seems to be diminishing: Ashmouni, Zafiri, Hamouli, Sea Island, Gallini and Ziftawi. They are generally less productive than Mitafifi, and in most cases their fibre brings a smaller market price.

All of the cotton produced in Egypt is grown under irrigation. Very little rain falls in the Nile Delta from the time cotton seed is planted in March until the last picking in November. The temperature rises from an average maximum of 73 degrees F. in March to an average maximum of nearly 95 degrees in August, declining to about 74 degrees in November. The average minimum temperatures are about 25 degrees lower. The air is exceedingly dry during the entire year, and especially during the early growth of the cotton. The relative humidity increases from May to November, but never becomes as great as that in the cotton belt of the United States. The earliest and best pickings are matured in a very hot, dry atmosphere, and the later pickings become successively poorer as the moisture increases and the heat declines. The irrigating water is under a control limited only by the supply. Flooding the lands while the cotton is maturing increases the moisture in the atmosphere from the abundant evaporation. The soil temperature at this time is from 80 to 86 degrees, and the conditions are such as to induce rapid development in vegetable growth.

The soils where all of the best cotton is produced are clay loams produced by alluvial deposit from the overflow of the Nile. They are rich in fertility from the Nile deposits, and their quality is further improved by the extensive growth of Egyptian clover, adding nitrogen and humus. Phosphoric acid and potash are usually present in sufficient quantities and are not applied in the form of commercial fertilizers. Lime and magnesia are also present in the soils. Nitrogenous manures are generally found most beneficial, especially where cotton and sugar cane are grown to the exclusion of clover and other leguminous crops.

Cotton usually follows clover in a rotation of crops. The land is plowed and stirred to a depth of about 13 inches, giving a deep, mellow seed bed. The surface is made compact and firm by a plank drawn over it like a harrow, the driver standing on the plank giving sufficient weight to crush

lumps and level, uneven places. A level, even surface is essential for good results in irrigated land. Ridges about 35 inches apart are made with a plow, and the seeds, after soaking twenty-four hours in water to hasten germination, are planted in hills 14 to 20 inches apart on the sides of these ridges. The cotton is thinned to two plants in a hill and hoed usually three times, being watered after each hoeing. After the third hoeing it is watered at intervals of twelve to fifteen days, until the time of the first picking, about the last of August, and it is watered again after the first and second pickings.

Experiments in the cultivation of Egyptian cotton in this country heretofore indicate plainly that there is little hope for success with this crop except in the South Atlantic or Gulf coast regions or in the irrigated lands of southern Arizona or California. The seasons elsewhere are too short for its complete maturity. There is also a relatively smaller proportion of organic matter in the American soils. All necessary elements may be supplied by means of fertilizers and by plowing under green crops. They are already present in sufficient quantities to produce a crop, providing other conditions are not unfavorable, and their extensive addition in the form of commercial fertilizers is recommended only after careful trial experiments on each farm have proved that the increased yield or the improvement in the land is sufficient to warrant the extra expense. In some soils, applications of barnyard manure or an increase in the humus will doubtless produce a larger growth and a larger yield of cotton. Although cotton has never been cultivated in the irrigated lands of the West sufficiently to be regarded there as an important staple crop, yet it has been grown to a small extent in southern California since the earliest historic records of that region. It thrives there under irrigation. It has been stated that while the fibre of common upland cotton, grown under irrigation in California, is slightly shorter than that of the same variety grown in Georgia, it is finer and fully as strong. It has further been proved that a fair crop of cotton may be obtained on land too strongly alkaline to produce wheat. A saline soil and a saline atmosphere are held to be beneficial in the production of the best quality of Egyptian cotton.

A comparison of temperatures indicates that in the Gulf region the mean maximum temperatures are generally slightly lower than those in Egypt, while the mean minimum temperatures are higher. In Arizona the mean maximum temperatures are much higher, while the mean minimum are lower. The average temperatures are doubtless high enough for the Egyptian cotton to grow to full maturity in Florida and southern parts of the Gulf States.

The atmosphere in Egypt is much drier than it is in the Gulf States. This dry air undoubtedly affects the growth of the plant and the development of the fibre, and it has been claimed to be essential to the production of luster, strength, and fineness, such as are found in the best quality of Egyptian cotton. The humidity of the Salt River Valley in Arizona during the months when fibre is developing, does not differ much from that of Egypt during the same period. Careful experiments conducted in other regions may prove that too much has been claimed in this respect for the dry air of Egypt.

The greatest differences of conditions affecting plant growth are found in the rainfall. Cairo, near the upper or southern end of the Nile Delta, has a total average rainfall of only 1½ inches per year, and Alexandria, on the coast, has less than 8 inches. Nearly all of this small amount falls during the winter months, so that the crop is produced practically without rain. When there is a sufficient supply of water for irrigation the Egyptian planters prefer that there should be no rain at all on the growing crop after it has passed the

second leaf. The small amount of rainfall in southern Arizona and central California indicates conditions favorable to the production of a good quality of fibre in those regions. The rainfall in the Gulf region does not prevent the production of a good crop, as has been proved by experiments before referred to in southern Texas and Louisiana.

If the production of Egyptian cotton is to succeed on a commercial scale in the United States it must be in the Gulf coast region, where the crop will have to withstand the conditions of uncertain rains, perhaps supplemented with irrigation, or in the irrigated lands of the Southwest. In the former region, cotton cultivation is well established and labor is comparatively cheap. In the regions where irrigation is practiced, farmers and laborers alike are generally unused to the cultivation of cotton on a large scale, wages are generally higher than in the cotton belt, and the field crops grown are such as require less hand labor than is involved in the "chopping," hoeing and picking of cotton. The most promising means for the successful production of Egyptian cotton in this country appears to be either in developing improved hardy and productive varieties that will withstand the conditions in the Gulf coast region, particularly its western part, or in devising methods of culture in the irrigated lands that will require less hand labor. It will be necessary in either case to keep up a continual selection of seeds in order that the quality of the fibre may be kept up to the highest possible standard.

—The experience of the last few years justifies the opinion formed among textile workers generally, that the introduction of a certain amount of moisture into cotton mills is not only advantageous in the treatment of fibrous materials, but under favorable conditions is also conducive to the health of the work-people employed.

Trade Secrets in Germany.

Trade secrets in Germany are jealously guarded by the German manufacturers, and in this they are supported by the substantial assistance of their courts of law. A case has recently been noticed in the German newspapers, which illustrates this point.

It appears that a foreman in the employ of a certain establishment invented a substance which his employer used in finishing "rustling" velvet. The use of this substance was considered a trade or business secret of the firm. The foreman, however, imparted the composition to others, and the firm had him tried under the law of May 27, 1898, entitled "An act for the suppression of base competition." The foreman was found guilty in the lower court. The case was appealed to the federal court and the defense made the point that the foreman had only imparted his own invention to others; that the same was his intellectual property. The federal court dismissed the appeal on the ground that the employee's discoveries become the property of his employer, because he was enabled to make the discovery only by means of such employment.

An Object Lesson in Protection.

The practical operations of a protective tariff in developing new industries is well illustrated in the case of tin plate.

In 1890 this industry did not exist in the United States to any extent. It then became the subject of special protective laws—and see the results:

Fiscal Year.	Pounds.
1891-1892	13,646,719
1892-1893	99,819,202
1893-1894	139,223,467
1894-1895	193,801,073
1895-1896	307,228,621
1896-1897	446,982,063
1897-1898	681,674,028
1898-1899	791,371,488
Total.	2,673,746,661

THE WOOL MARKET.

Graphic Chart of Fluctuations in Wool Values brought up to date

During May the wool markets both here and abroad have been in a state of extreme dullness, approaching paralysis, and prices have steadily declined. There has been no panic, and this has been due solely to the fact that wool is in the possession of those who do not have to sell it, and for this reason alone, the decline has been kept within its present limits.

The London auctions opened at a decline of from 10 to 15 per cent. on fine wools, and from five to 10 per cent. on the coarser grades. After this sale a slightly improved feeling was reported in the wool trade, probably owing to the worst regarding the decline being known, but there has been no strengthening of prices.

The views of American growers, as to values, are three or four cents above Eastern ideas, but very little of the new wool has changed hands. Sales of fine medium Territory have been reported in the West, on a basis of 55 cents scoured, which is from two to three cents above the Boston market; but reports of such transactions are somewhat open to question. As the month closes, the situation prevailing in London and the Eastern wool markets, appear to have reached the ears of the Western growers, as a report states that they are weakening a little.

Weather conditions have been favorable for a large clip in this country. The Agricultural Department reports the average condition of flocks throughout the United States at 99.9 per cent., and it appears now that the shortage in Australia, which was so well advertised during the rise in wool prices last fall, amounts to but eight per cent., and this is slightly reduced by the increase in the New Zealand crop.

Fine wools, for which the rise in prices last fall was the greatest, now exhibit the most weakness. It is apparent that the speculation in wool in the latter part of 1899 was greatly overdone. The present decline is a natural result of that booming of prices, and an examination of the lines in the chart at the head of this article shows at a glance that present quotations are still far above those of last summer.

The recent high prices stimulated imports, and for the ten months ending April, 1900, 89,948,655 pounds of the three classes were brought in, as compared with 52,418,675 for the same period for 1899, and 71,945,836 pounds in 1898. During April, 1900, 9,892,693 pounds were imported, against 7,299,327 pounds in April, 1899.

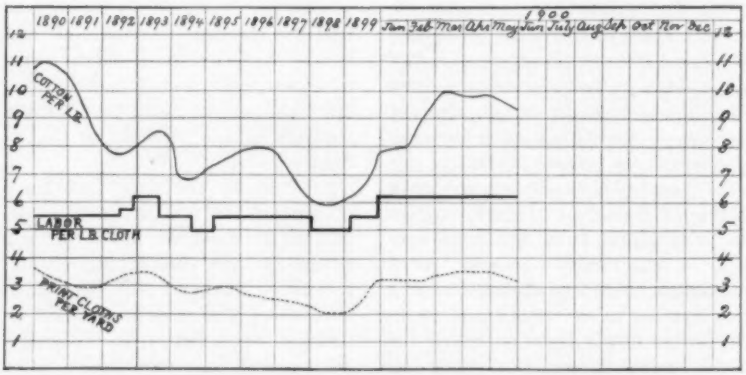
While mills have been busy on old orders, and stocks of raw material largely drawn upon, it must be remembered that much of the merchandise formerly made of wool, is today manufactured from cotton, shoddy,

and other substitutes. The use of cotton for men's wear worsteds, has grown to immense proportions, and, while the mills making the best grades of pure wool goods are slack, the looms weaving attractive and cheap fabrics, made with a percentage of cotton varying from 50 to 100 per cent, are very busy.

The goods market has been draggy, and cancellations of orders have been received at a time when duplicate orders were hoped for. This condition, in connection with the approaching political campaign, and the pronounced downward tendency of prices in all lines of trade, have caused manufacturers to hold aloof from the market, preferring to let someone else own the wool. Dealers are expecting an improvement when the largest buyers begin operations; but such concerns do not usually advertise with a brass band their intention to buy and it will probably be found that they have quietly replenished their depleted stocks during the depression.

Much of the actual business done has been below current quotations. The reported sales in the three leading markets of this country for four weeks of May have been only 8,884,000 lbs. domestic and 3,310,000 lbs. foreign, total 12,194,000 lbs.; as compared with 39,141,800 lbs. for same period of 1899.

COTTON MARKET.


1890 1891 1892 1893 1894 1895 1896 1897 1898 1899
1900
Jan Feb Mar Apr May Jun July Aug Sep Oct Nov Dec
12 11 10 9 8 7 6 5 4 3 2 1
COTTON PER LB.
LABOR PER LB. CLOTH
PRINT CLOTHS PER YARD

Graphic Chart of Fluctuations in Prices of Cotton, Labor and Print Cloths.

By the culmination and collapse of the bull speculation of a prominent house, an artificial factor has been removed from the market, and its course confined to the legitimate influences of trade conditions.

Owing doubtless to the high prices prevailing, the market for cotton goods has been dull, but there are no pronounced signs of an over-supply of goods, and there are indications that orders for both the domestic and foreign trade would be freely placed at a slight concession in price.

This concession has already been made in print cloths by the reduction to 3⅛ cents at Fall River, and the sales of print cloths in outside markets at 3 cents for some time previous to the Fall River reduction.

During the last 8 months the prices for goods throughout the world have had a marked rise; in Manchester this rise is estimated at 35 per cent., and it is to be expected that buyers would be cautious about placing orders at top figures; with a decline in prices we may expect an increase in volume of trade to supply the demand.

As to the supply, the great undetermined factor is the size of the American crop. This is the case every year.

but especially so in 1900, as it is known definitely that the Indian crop is to be a small one.

The weather reports for the American crop are generally favorable and with the large acreage which is supposed to be under cultivation, the trade have great difficulty in finding bull points in the Southern cotton fields.

This is offset by the undoubtedly small stock of cotton in the world's markets and at the mills. An English authority on the cotton trade estimates that the normal movement of cotton would exhaust the world's stock by the 31st of August. This small stock on hand keeps the market for spot cotton strong, but with a large, new crop assured, the stock could shrink to very small dimensions without inconveniencing the mills or materially affecting prices. A difference of over 1½ cents now exists between old and new crops.

Prices during the month have been depressed by the failure above mentioned. This influence was greatest on early deliveries. Late reports from Egypt state the Nile is rising to usual height and that prospects for a good crop have improved there. The Chronicle's figures as to world's visible supply of cotton May 26, 1900, are 2,035,552 bales as compared with 3,686,070 bales in 1899; 3,013,859 bales in 1898, and 2,501,032 bales in 1897.

List of Exhibitors in the United States Textile Department, Paris Exposition.

The following is an official list of the exhibitors in the United States textile department at the Paris Exposition, whose goods have been shipped and are on the grounds or in transit. According to the requirements of the French officials of the exposition, the textile departments of all nations are obliged to accommodate other classes of goods than those purely textile.

Silk Exhibitors.

(See page 669, April issue.)

Johnson, Cowdin & Co.; Smith & Kauffmann; Pelgram & Meyer; Stearns, J. N. & Co.; Bridgeport Silk Co.; Stern, Pohly & Herrman; Castle Braid Co.; Gotham Silk Mills; Cardinal & Becker; Liberty Silk Co.; Empire Silk Works; Richardson Silk Co.; Doherty & Wadsworth; Paterson Ribbon Co.; Julius Kayser; Anderson Bros. (silk loom).

Miscellaneous.

Arlington Mills; Lawrence, Mass.; American Hosiery Co., New Britain, Conn.; Aberfoyle Mfg. Co., Chester, Pa.; Asch & Jaeckel, New York City (furriers); Auerbach, Louis, New York City (neckwear); Aultman, Miller & Co., Akron, O. (twines); Ballardvale Mills, Ballardvale, Mass.; Botany Worsted Co., Passaic, N. J.; Cluett, Peabody & Co., Troy, N. Y. (shirts, collars and cuffs); Deering Harvester Co., Chicago, Ill. (twines); Singer Sewing Machine Co., New York City; Wheeler & Wilson Mfg. Co., New York City; White Sewing Machine Co., New York City; New Home Sewing Machine Co., New York City; Joseph Hirsch & Sons, New York City; Hockanum Co., Rockville, Conn., Lorraine Mfg. Co., Pawtucket, R. I.; McDowell Garment Drafting Machine Co., New York City; F. Muhlhauser Co., Cleveland, O.; Merchant Tailors' Nat. Exchange of the U. S., 381 5th Ave., N. Y.; McCormick Harv. Machine Co., Chicago, Ill. (binding twine); John J. Mitchell Co., New York City (fashions for men and women); Louis Myers & Son, New York City (gloves); Northwestern Grass Twine Co., St. Paul, Minn. (binding twine); Peace Dale Mfg. Co., Peace Dale, R. I.; Pelzer Mills, Pelzer, S. C.; Potomska Mills, New Bedford, Mass.; Ponemah Mills, Taftville, Conn.; Henry Roelofs & Co., Philadelphia, Pa.; Revellon freres, New York City (furriers); Sara Reidy, Chicago, Ill. (hair dressing); Standish Worsted Co., Plymouth, Mass.; John B. Stetson & Co., Philadelphia, Pa. (hats); Joseph H. Taft, New York City (embroidery and applique curtains); Troy Laundry Machine Co., Chicago, Ill.; Clarence Whitman & Co., New York City (lace curtains made by machinery); Warnock Uniform Co., New York City (army and navy caps); Wamsutta Mills, New Bedford, Mass.; J. B. Wiggins & Sons, Orange, N. J. (burlaps); Mrs. G. Taylor, New York City (The Taylor Square and Bias Rule, demonstration of garment cutting by same); Mrs. Candace Wheeler, New York City, collected and furnished a large exhibit of laces and embroidery. Her personal exhibit is needlework, embroidery and drapery.

The following persons also contributed to Mrs. Wheeler's exhibit:

Mrs. Florence H. Brady, Brooklyn, N. Y. (embroidery and linens); Mrs. C. J. Stephenson, Red Bank, N. J. (embroidery and linens); Mrs. J. Chas. Van Cley, Ellenville, N. Y. (embroidery and linens); Mrs. Caledonia J. Sankey, Rochester, N. Y. (embroidery and linens); Mrs. Lilian Barton Wilson, Brooklyn, N. Y. (embroidery and linens); Mrs. E. Coxhead Taylor, New York City (embroidery and linens); Mrs. Christine Obery, Portland, Oregon (embroidery and linens); Mrs. J. H. Havens, Brooklyn, N. Y. (embroidery and linens); Mrs. Harriet O. Emerson, Brookline, Mass. (embroidery and linens); Mrs. A. W. Foster, New York City (embroidery and linens); Decorative Art Society, Baltimore, Md. (embroidery and linens); Mrs. Adelaide von Rathgen, Gotshall (laces); Mrs. Sybil Carter, New York City (exhibit of Indian hand-made laces).

The Protection of Industrial Property in the Paris Exhibition of 1900.

The French Senate and the Chamber of Deputies have adopted, and the President of the Republic promulgates, a law to the following effect:—

1. Every person enjoying in France an exclusive right by virtue of the laws affecting industrial property, or persons claiming under him, may, without incurring the forfeiture of his privilege, exhibit at the Universal Exhibition of 1900 in Paris, and may introduce for this purpose into French territory articles manufactured abroad and resembling those which are guaranteed by his title, provided that these articles have been duly admitted to the Exhibition.

2. Nevertheless, the forfeiture provided by the existing laws shall be incurred if the articles referred to in Article 1 are not re-exported within a period of three months dating from the day either of the official closing of the Exhibition or of the order for removal previously given and notified to the interested parties by the proper authorities.

3. Every person who shall have exhibited at the Universal Exhibition of 1900 an article resembling that which is guaranteed by his title of industrial property shall be considered, so far as may be necessary, as having worked his discovery or his invention in France during the period of the Exhibition. The terms provided by the laws concerning industrial property, at the expiration of which forfeiture is incurred in default of working, shall run anew either from the official closing of the Exhibition or from the order of removal previously given and notified to the interested parties by the proper authorities.

4. Articles exhibited in the Universal Exhibition of 1900 which shall be alleged to be infringements or bear marks or other indications forbidden by law, shall only be liable to seizure there by description. Nevertheless, articles admitted to the Exhibition, circulating in France in transit to or from the Exhibition, or exhibited therein, shall not be liable to seizure even by description unless the party seizing is protected in the country to which the party whose articles are seized belongs. The prohibition of seizure shall cease if the articles in question are sold in France, or if they are not re-exported within the period prescribed by Article 2.

Graduation Exercises of the Lowell Textile School.

The graduation exercises of this school were held Tuesday afternoon, June 5th. The occasion was especially interesting as the first on which diplomas had been presented to students in the day class, who had completed the full course of three years.

Following is a list of the graduates, their course of study, and theses.

Cotton Manufacturing: Isaac Walwin Barr, Lowell, Mass., The Effect on the Breaking Strength of Yarn Produced by Varying Conditions of Draft and Twist; George Francis Lamson, Lowell, Mass., A Comparison of Evenness and Strength of No. 25 Warp Yarn Employing Two and Three Processes of Drawing; Stephen Eaton Smith, Lawrence, Mass., Investigation of Evenness of Product and Amounts of Waste made in Cotton Carding.

Wool Manufacturing: Henry Albert Bodwell, Andover, Mass., Details of the Manufacture of a Ten Run Woolen Yarn (with A. A. Stewart); Chauncey Jackson Brickett, Haverhill, Mass., Investigation of Scaife or Builder Motion on a Worsted Spinning Frame; Arthur Andrew Stewart, Beauharnois, P. Q. (with H. A. Bodwell, see above); James Francis Syme, Worcester, Mass., The Dobby in Relation to Weaving.

Designing: John Edward Perkins, Pittsfield, Mass., The Setting and Reeding of a Perfect Fabric; Alois Joseph Pradel, Collinsville, Mass., Cloth Construction.

Chemistry and Dyeing: Arthur Lincoln Baldwin, Lowell, Mass., An

Experimental Research to Determine the Quantity of Indigo Deposited upon the Fibre; Robert Reid Sleeper, Lowell, Mass., An Experimental Research to Determine the Fastest and Cheapest Direct Cotton Black; Henry James Thompson, Lawrence, Mass., The Action of Alkaline Solutions upon Various Grades of Wool in the Process of Wool Felting and Scouring.

Certificates were presented as follows: One Year's Post Graduate Course in Decorative Art and Designing, Katharine Burrage, Lowell, Mass.; Three Year's Course in Decorative Art and Designing, Laura Etta Campbell, Lowell, Mass.; Fanny Shillabor Lakeman, Salem, Mass.; Amy Helen Goodhue, Dracut, Mass.; Edith Clara Merchant, Lowell, Mass.; Ida Alberta Woodies, Lowell, Mass.; Three Year's Course in Cotton Spinning and Weaving, John Pelopidas Leach, Jr., Littleton, N. C.

The programme of the exercises was as follows:

Music, American Orchestra.

Address, Franklin W. Hobbs, Ass't. Treas. Arlington Mills, Trustee on the part of the Commonwealth of Massachusetts.

Abstract, Investigation of Evenness of Product and Amounts of Waste made in Cotton Carding, Stephen Eaton Smith.

Abstract, Investigation of Scaife or Builder Motion on a Worsted Spinning Frame, Chauncey Jackson Brickett.

Class History and Statistics, James Francis Syme.

Music, Serenade, Herbert.

Abstract, The Setting and Reeding of a Perfect Fabric, John Edward Perkins.

Abstract, An Experimental Research to Determine the Quantity of Indigo Deposited upon the Fibre, Arthur Lincoln Baldwin.

Address, William W. Crosby, Principal.

Presentation of Diplomas, A. G. Cumnock, President of Trustees.

Music, American Orchestra.

Mr. F. W. Hobbs, asst. Treas. of the Arlington Mills, in his address treated the evolution of manufacturing methods in England and this country from their primitive beginnings to the present time, showing tendency in all trades to the specializing of work in each department. He closed with a strong appeal to his hearers to keep in mind the necessity of building up character, on which true success rests.

Prof. Wm. W. Crosby also addressed the students, giving them good advice and many suggestions as to their future career.

The graduation exercises of the evening class were held on May 16th. A large number were in attendance.

The exercises closed with the presentation of diplomas.

There were twenty-one graduates who received diplomas, as follows:

Cotton course, three years—William Lorenzo Wardrobe, Lawrence; William Sanford Woodbury, Lawrence; Arthur Eugene Silcox, Charles Franklin Osgood, James Donnelly, Arthur Dane Colby, Herman Cecil Rowell, Lowell.

Worsted spinning course, two years—Albert Birtwhistle Cawthra, Wigginville; Samuel Antcliffe Ogley, Lowell; Albert Dean Campbell, Lawrence; William James Jones, Harry Maden, Herman Cecil Rowell, Ernest Nelson, Lowell.

Chemistry and dyeing course, three years—Fred Lyman Snow, Joseph Waterhouse, Lowell.

Designing course, three years—Charles True Wing, Lowell; Frederick Robinson Elston, Lawrence.

Weaving, three years—John Howard, Clarance Hutton, Harry Carmi Parker, Lowell.

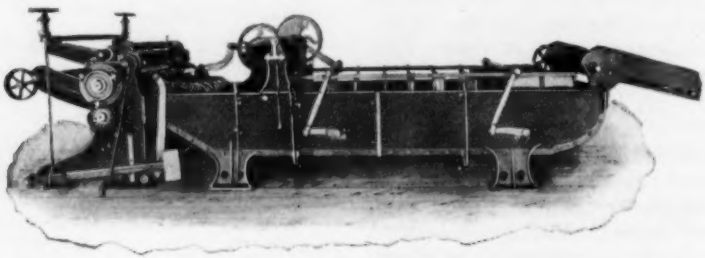
—In many cotton cloths, in which extra weft figuring is resorted to, the warp threads are so few, and the ground weave so open, that the appearance of this weft on the back of the cloth would be perceptible through the ground cloth, and the full effect of its ornament would be destroyed.

Wool Scouring by Sargents' System.

A treatise on any of the processes of woolen and worsted manufacture would necessarily include wool scouring. After sorting it is the first treatment to which the wool is subjected, and upon it depends in a great measure the success of subsequent operations.

Wool, from which the grease and dirt have been but partially removed, or which has been felted, matted and tangled, can not be dyed, carded, combed, drawn, spun, woven, or finished, properly.

The problem is to remove the grease and dirt with the least possible disturbance of the fibre itself.



The improved machine shown in the accompanying illustration, built by Messrs. C. G. Sargents' Sons, Graniteville, Mass., goes far toward realizing the ideal conditions under which the mechanical operations of wool scouring should be conducted.

The wool is first put into a self feed; this not only causes the wool to pass through the machine in a steady, uniform quantity, exposing every fibre to the same action from the scouring liquor, but it also acts as a preliminary opener, the slowly moving spiked apron and comb of the feed doing a great deal toward opening the masses of wool; then the wool enters a duster which completes the opening process and removes large quantities of the loose dirt, and prevents it from polluting the scouring liquor.

The wool comes from the duster in a light fluffy mass and is pressed under the liquor by the parallel rake, which has been designed to move the wool from one end of the bowl to the other, without unnecessary agitation, avoiding any motion, that would felt or tangle the fibres, and keeping the material constantly submerged and exposed to the action of the liquor. It duplicates as near as is possible the motion of wool floating in a current of liquid, and, being mechanically operated, keeps the wool moving at a uniform speed. This point has been tested by repeatedly timing the passage of a handful of colored stock from the feed to the delivery end of the machine and practically no variation was observed.

Wool, from which the grease and dirt has been removed in this way, will noil less, card out better and make more uniform yarn, and more perfect goods.

The carrier, which takes the stock from the rake to the squeeze rollers, makes four movements to one of the rake, and thus carries a continuous, light, and even feed to the rollers with no bunching.

The carrier inclines gently with a chute to the press rolls, which are set low and entirely apart from the liquor in the bowl. The wool is practically immersed while passing to the rolls, and the liquor squeezed out by the latter is continually pumped back into the feed end of the machine. This is a very desirable feature, as the current obtained thereby, serves to carry the wool along evenly as it drops from the doffer apron of the preceding bowl. In connection with the washers Messrs. Sargent Sons make a settling tank; this is located beside the soaking bowl, in a train of washers, and separates a large amount of soiled

grease, scum and sand, which would otherwise remain in the first bath, and not allow same to be used long to advantage.

These bowls are built in four lengths—sixteen, twenty-one, twenty-seven and thirty-two feet long, and in combinations up to four bowls. The washers are also built either thirty-six or forty-eight inches wide, and plants installed ranging in capacities from 1,000 to 20,000 pounds of wool per day.

Concentration of Manufacturing in Germany.

The census of occupations taken in Germany, in 1895, has just been published. A comparison with the census of 1882, shows a marked tendency for manufacturing of all kinds to become concentrated in a few large establishments.

Between 1882 and 1895 in German textile mills with over 1000 hands, the total number employed increased 125 per cent.; in mills employing between 200 and 1000 hands, the increase was 83 per cent.; in establishments employing from 51 to 200 hands, the increase was 47 per cent.; in manufactories of from 11 to 50 hands, the increase was 19 per cent.

Small manufactories employing less than 11 hands showed a marked decrease in total number employed.

Wages in England.

It is estimated that nearly 700,000 employees, most of whom were in the textile and metal industries, secured an increase of 33 cents per capita per week in England, in January 1900.

For 72 per cent. of this number the increase was secured by the "Wages and Conciliation Boards;" for 27 per cent., it was the result of previously arranged sliding scales; only 1 per cent. of these workers were compelled to strike in order to secure the increase.

Protection in Canada.

The preferential tariff in favor of imports from Great Britain, which is about to go into effect, has excited great alarm among the woolen manufacturers in Canada, and a large and influential deputation of woolen manufacturers waited upon Sir Wilfred Laurier, and pointed out to him the ruinous effect which the new duties would have on the Canadian industry. They claim that in addition to the British manufactures, large quantities of goods made in Germany would be brought in as British goods.

Limbless Cotton.

A Louisiana cotton planter writes to the Cotton Planters' Journal of his experience in raising Jackson Limbless Cotton. He states that he planted seven acres, from which he picked 20 bales of cotton averaging 450 lbs. to the bale. The soil was light and sandy and the plants were cultivated in the same way as his other cotton and he had a bad stand. He replanted a patch of 58 by 60 steps and obtained a good stand. He picked from this 3168 lbs. seed cotton.

Part of the crop was sold in New Orleans for 7¾ cents, while the ordinary cotton brought 7½ cents. He sold the seed for $6.00 per hundred. The seed from ordinary cotton brought $2.00 per hundred. The correspondent feels well satisfied with the experiment.

YARN MERCHANTS' ASSOCIATION.

An association bearing this title has been formed by several of the leading cotton yarn commission houses of New York and Philadelphia and a charter has been applied for in Pennsylvania.

The promoters state that the Association has been formed to correct abuses in the marketing of cotton yarn, and that any dispute between buyer and seller will be referred to a

committee of this association for investigation, and that this committee will decide whether legal action be taken or not; they also state that no conflict of interests exists between this body and spinners' association; on the contrary, members of the spinners' association will be welcomed to membership in the new organization.

Among the organizers are the following: Richard A. Blythe, Abegg and Rusch, Buckingham and Paulson, J. H. Lane & Co., Thomas & Houston, Hoffman, Corkran & Co., Schell, Taylor and Longstreth, Hooper, Sevin & Co., James F. White & Co., William D'Olier & Co., James E. Mitchell & Co., Charles J. Webb & Co., William M. and T. W. Sharpless, Wilson and Bradbury, and the Tillinghast-Stiles Co.

The Chinese Market.

Consul Wildman, of Hong Kong, has recently written a report to the State Department, in regard to the Chinese market for American goods. From it, we judge that the woolen manufacturer need not hope to reap any direct benefit for his products from this market, as Mr. Wildman says that the Chinese never wear wool, not even in the depth of winter. The native population clothe themselves in cotton all the year around. Their bedclothes, umbrellas, and boat sails, are made of cotton, and the consumption is practically unlimited, if made in accordance with native requirements. They require strong, unbleached cloth, twenty-two inches wide, retailing at about five cents gold standard, per yard. There is also a good market for a cotton cloth which has been made rain proof.

Cotton Goods in Puerto Rico.

Cotton goods worth $2,000,000 have been annually imported into Puerto Rico under the Spanish rule; of this amount only 275,000 dollars worth have come from the United States.

With the increased prosperity of the island as part of the United States, the consumption of cotton goods will undoubtedly increase, and practically the whole amount will be supplied by American mills.

—Consular General Patterson, of Calcutta, in a recent report, states that the season in India has been disastrous for the cotton crop. Reports from all sections are uniformly unfavorable. He states that not a fifth of an average crop will be obtained in central and western India. He estimates the area and yield for the whole of India as follows:

	Acres.	Bales.
1898	14,170,501	1,365,864
1899	11,015,393	641,327

—The advantage of the jacquard machine is very apparent in the production of cloths the figuring threads of which are all of one shed or lift.

—In 1826, Thompson discharged indigo blue with bichromate, and thereby showed how to make a whole series of interesting and beautiful patterns by the aid of chromic acid.

—Half-silk, cotton—silk goods are much in demand at the present time, and their use is certainly increasing. These goods are now generally dyed in the piece.

—Angora goat breeding, no doubt, has not been a success in any part of Australia, owing doubtless to the extremely hot weather in that country, all the year round, and to insufficient altitude. This is especially important in hot countries, and anything less than 3,500, would hardly do in Australia. This low altitude, which naturally causes a more oppressive climate, has given Australia a very bad reputation for the culture of Angoras, for, not the least doubt, whatever can exist, that with hardly an exception, they are not paying expenses there, as owing to the extremely hot weather, by far the largest part of the very young kids die of sunstroke.

COTTON DEPARTMENT.

Types of Woven Fabrics.

THEIR CHARACTERISTIC FEATURES, CONSTRUCTION AND MANUFACTURE.

ARTICLE VI.—DAMASK FABRICS—(Continued).

HARRY NISBET.

(Copyright.)

The preparation of designs, to be reproduced by means of either a compound pressure harness, or a damask machine, is extremely simple, and demands very little technical knowledge combined with good draughtsmanship. This is because a designer for such fabrics has to deal with their ornamentation only, apart from their texture, which is predetermined, and entirely under the control of the apparatus governing the warp-ends, which circumstance greatly simplifies and expedites the work of both designer and card-cutter.

Each vertical space on design paper represents such number of warp-ends as are grouped together: also, each horizontal space represents a pattern card and, consequently, such number of picks as may be inserted for each card.

When preparing a damask design, the designer does not represent the working of individual warp-ends and picks, as when preparing a design for a brocade or other simple fabric, where warp-ends may be operated as desired; but he merely indicates the manner in which hooks are to be raised and left down by painting up the design en bloc without any binding weaves. Such a design, therefore, is not a plan of the fabric indicating the manner in which warp and weft are interlaced, but simply a plan of the scheme of decoration.

Fig. 33 is a portion of a leaf showing the method of preparing a damask design; and Fig. 34 shows how it would be reproduced in a fabric, in which three warp ends are commanded by one hook, and three picks inserted for each pattern card. The binding weave is a 5-end satin.

As a consequence of controlling warp-ends in groups, and inserting several picks to a card, a somewhat coarsely "stepped" edge is imparted to the figure and ground. This "stepping" is more or less pronounced according to the number of ends controlled by each hook of the jacquard machine, and also, according to the number of ends and picks per inch in the fabric.

Care should be taken to obtain a suitable ratio between the number of ends controlled by each hook, and the number of ends per inch; and also between the number of picks inserted to each card, and the number of picks per inch, so as to avoid causing the edges of figure to appear too rough or jagged. The means adopted for binding the separate threads of warp and weft in a damask fabric is also detrimental to the formation of a clearly cut and sharply defined outline of figure, particularly when the latter is not exactly parallel with the warp-ends or picks. This arises in consequence of binding points occurring with such perfect regularity over the whole of the fabric that they encroach upon the extreme edges of both figure and ground in places, where they are unnecessary; causing figure and ground to blend one into the other.

As it is impossible, excepting with diaper patterns, to ensure the "checking" of binding points upon edges of figure or ground, which are parallel to either warp or weft, the threads at these places slide out of their proper place from causes already explained, and illustrated in Fig. 9a, Article III.

The character of these defects will be clearly comprehended by a parallel reference to Figs. 34 and 35; and by carefully examining a damask

fabric. Fig. 35 shows the manner in which the same portion of design as Fig. 33 would be developed if it were pick, provided it had to occupy the same number of ends and picks as in Fig. 34. Although they are similar in

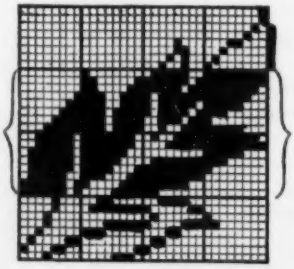


FIG. 33

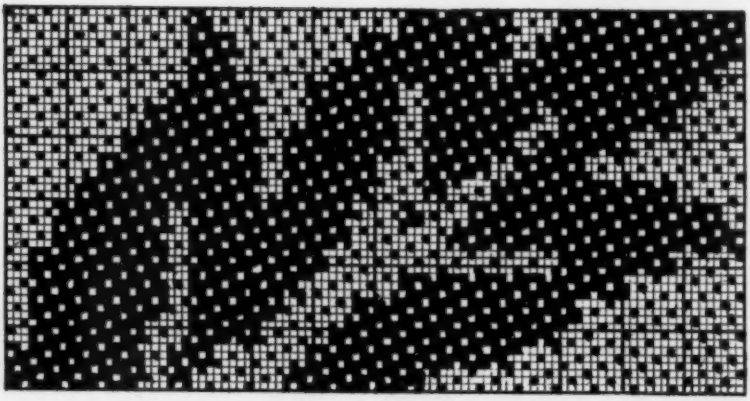


FIG. 34

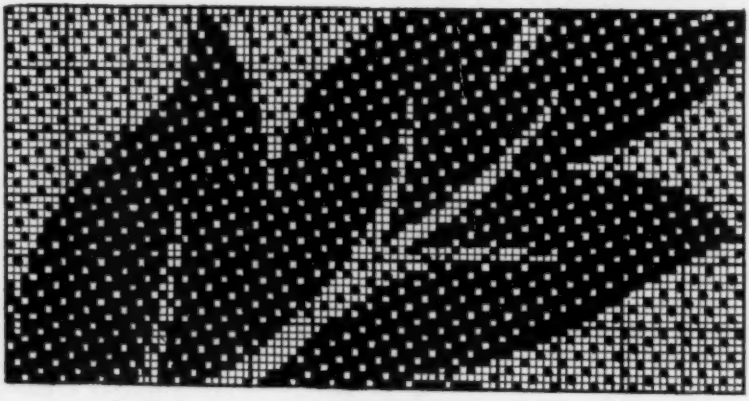


FIG. 35

to be woven by means of an ordinary jacquard harness, having independent control of each warp-end, and if a pattern card were used for each other respects, there is a marked contrast in their outlines—that of Fig. 35 being very much smarter in appearance. It will be observed, that bind-

ing points have not been allowed to encroach upon the edges of figure or ground, excepting where they were absolutely necessary to prevent too long floats: also opportunity has been taken to "check" wherever it was necessary in order to preserve a clear outline by preventing ragged edges.

The counts of design paper to be used for a damask design is not determined according to the ratio of ends and picks per inch in cloth, as is the case for simple fabrics generally; but according to the number of groups of warp-ends and number of cards representing one inch of cloth. Thus, assuming a design is to be made for a fabric containing 114 ends per inch, with three ends grouped together, and 66 picks per inch, with two picks to each card, the ratio of hooks and cards per inch would be as 38 to 33. If the needles of the jacquard, by which the design is to be woven, are eight rows deep, then,—38 (hooks per inch) : 8 (hooks in a bar) : : 33 (cards per inch) : 7 (cards in a bar) nearly. Therefore, the proper counts of design paper to use, would be 8×7.

When damasks are woven by means of the compound pressure harness with more than two warp-ends drawn through each mail, it is usual to employ what are termed "decked" mails, one of which is represented in Fig. 21, Article IV. Each warp-end passes through a separate division in the mail, whereby they are prevented from twisting around each other between the back rest of the loom, and the heald eyes; and shedding by the healds is facilitated.

The weight of lingoes attached to the bottom of harness threads must be suited to the counts and strength of warp-ends, and also to the number of ends drawn through each mail. Strong or coarse yarn, also mails controlling a greater number of ends, will require heavier lingoes than are required for fine yarn, or for mails controlling a less number of ends.

With a compound pressure harness, the same set of pattern cards may be employed to weave fabrics having a different number of ends and picks per inch from that for which the pattern was originally intended. This is accomplished by increasing or reducing the number of threads in some or all of the mails, and by inserting more or less picks to some or all of the cards. Care must be taken, however, if any of these courses are adopted, to maintain the same ratio between hooks and cards per inch as that for which the design was set out, otherwise the pattern will be distorted. These advantages are not possible with the use of damask jacquards such as are described in Article V.

Unlike that of brocades and similar fabrics of a simple character, the stability of damask fabrics is entirely unaffected by the character of the design upon it, by reason of the absolute uniformity of texture in both the figure and ground portion. This property permits of the successful reproduction of almost any kind of pattern whether of a geometrical or floral character, provided, of course, the detail of the design is properly regulated according to the quality of the fabric. As with designs for other fabrics, so with those for damasks—they may possess a greater amount of detail for fine than for coarse fabrics.

In most fabrics of simple texture it is important that large masses of figure should be avoided to prevent weakness, and that the figure should be distributed over the surface as uniformly as possible to ensure uniform tension upon warp-ends; but these conditions cannot arise in damasks, for reasons already stated.

The following is a comparison of the number of cards and jacquard machines required to produce a pattern repeating on the same number of ends and picks to be woven (a) by means of either the compound pressure harness or a damask machine; and (b) by means of an ordinary single-thread harness.

Assuming that in case "(a)" a jacquard machine with 408 needles is employed—all of which are used in a repeat of the pattern—and that each

needle corresponds to five warp-ends, also that the pattern repeats on 408 cards, and that three picks are inserted for each pattern card, the total number of warp-ends on which the pattern will repeat is $408 \times 5 = 2,040$; and the total number of picks is $408 \times 3 = 1,224$.

Now, in case "(b)" five such machines, each with three times the number of cards, would be employed; therefore, $5 \times 3 = 15$ times as many cards, or a total of $2,040 \times 3 = 6,120$ cards would be required, with a corresponding amount of time and labor expended in designing, card-cutting, lacing, and wiring. Of course, over against this is the extra cost of the heald harness and parts for operating the same, if a pressure harness is used; and if a damask machine is used, its extra cost must be taken into account.

(To be continued.)

—The Chinese gin is a clumsy little machine in which two rollers press upon the cotton to squeeze out the seeds.

Spinning Fine Yarns in the South.

Address by Arnold B. Sanford, of Boston, Mass., at The Southern Cotton Spinners' Association, Charlotte, N. C., May 11, 1900.

In discussing this important and very interesting topic, I shall confine myself to the spinning of fine yarns, and the long staple cottons used in their productions, "the Allen Seed," "Sea Islands," and "Egyptians." It is my desire to treat this subject without any prejudices whatever; to deal fairly and justly with the conditions as they exist both in our New England and Southern States, and as they appear after twenty years of experience in close touch with the great cotton industry, North and South. Now, in order to make the discussion practical and lively, we will commence by propounding the following questions, and seeking a true solution to the same later on:

First. What are fine cotton yarns, and what is necessary for their successful production?

Second. Are the Southern manufacturers prepared to produce them successfully and compete against New England mills?

Third. Can they make as much money on fine yarns as they can on the coarse and medium numbers?

Before taking up the questions, I wish to make a few remarks on the cotton industry.

The establishing of any great textile industry, like cotton, wool, linen, and silk in any country is a very slow process, and usually takes generations to plant firmly and successfully. Why? Because we must learn to handle it so as to produce goods of the best qualities, with the largest productions, and at the lowest possible cost. This can only be accomplished by skilled labor, capital and experienced management to bring success. This takes years to bring around. The silk industry of Lyons, France, still leads the world in the production of the finest goods, and it was commenced in the fifteenth century. The woolen industry: We turn at once to Leeds, England, for the finest goods and colors; she leads the world, and it was commenced there in the sixteenth century.

The cotton industry: Great Britain, with her 46,000,000 spindles, leads the world in the great race, and Oldham, Bolton and Manchester are made famous for their fine cotton goods and yarns. The manufacture of cottons commenced in Manchester in the fifteenth century, and in the year 1552 an Act was passed for the better manufacture of Manchester cottons, which became famous in the year 1650.

The New England States, though engaged for a century in the business, seems quite young compared with old England, yet she has made her Lowell, Fall River, New Bedford and Lawrence famous for her cotton manufacture.

In this connection the following figures will be of interest, showing the

growth of the industry for England and United States:

The total spindles of Great Britain estimated Jan. 1, 1900.....46,000,000

The total spindles of United States estimated Jan. 1, 1900.....21,000,000

The total spindles of New England States estimated Jan. 1, 1900, 13,955,000

The total spindles of Southern States, including year 1900...5,250,000

FOR NEW ENGLAND STATES.

1840 number of spindles	1,597,400
1850	1,800,000
1860	3,859,000
1870	5,498,300
1880	8,632,100
1890	10,836,200
1899 (August)	13,955,000

Representing say $280,000,000.00 of capital, this magnificent result speaks volumes for the thrift and energy of our New England manufacturers and operatives, which means so much for the prosperity of the New England States.

FOR SOUTHERN STATES.

1840 number of spindles	180,900
1850	230,000
1860	298,600
1870	327,900
1880	1,554,000
1890	3,670,290
1900	estimated 5,250,000

For the fifteen months ending March 31, 1900, projected 2,000,000 spindles, a tremendous growth, and South will have for end of year 1900 $125,000,000 invested in the cotton industry,—a most magnificent showing for our Southern manufacturers and operatives. This remarkable result is a splendid tribute to the energy and enterprise of the Southern people, and challenges the admiration of the business world, and some are saying, "Southward the course (not of Empire) but of the cotton industry takes its way."

Let us now take up our questions.

First. What are fine yarns, and what is necessary for their successful manufacture?

Fine yarns in the trade today means numbers 80s to 140s, inclusive, and to make this clear to you, note the production per spindle on No. 80s yarn running sixty hours per week, which produces only ⅛ of a pound per spindle, and for No. 100s only ⅙ of a pound per spindle per week. There are several necessary factors required to produce high grade fine yarns. It is absolutely necessary to have the very best skilled operatives that can be secured.

The manager should have long practical experience, and be well acquainted direct with the consumer, so as to be able to meet his wants. He requires expert knowledge of the long staple cottons used such as

Allan Seed, 1 3-8 to 1 1-2 inches long.
Sea Island, 1 1-2 to 2 inches long.
Egyptians, 1 3-8 to 1 7-8 inches long.

Very careful selections must be made so as to secure proper fineness of fibre, and uniform lengths of staples "as so much depends upon this." These cottons are very expensive, and the manufacturer should understand this part of the business well, so as to know just what lengths of staples, and grades, are required for the various kinds of yarns to be made; if he does, he can save considerable money over one who does not.

Great care and economy must be exercised in all the various processes of picking, carding, combing, drawing, rovings, spinning, twisting, reelings, sizing, etc., in order to produce high grade yarns, and eternal vigilance must be constantly exercised. The Southern manufacturer will find making No. 80s to 100s yarns altogether different business than the making of No. 30s and 40s.

Secondly. Are the Southern manufacturers prepared to produce them successfully and compete against New England mills?

My answer to this very important question would be, "Today they are not," and this conclusion has been most carefully arrived at by a close study of the conditions surrounding

the industry in the South, and from personal observations. Some of my reasons are as follows:

The successful production of fine yarns on a large commercial scale and with profit, requires experience and most favorable conditions for labor and economical management.

The South, up to the year 1880, made yarns, No. 30s and below, and did not take up No. 40s until about the year 1885, and today has only about 100,000 spindles on No. 40s to No. 50s yarns, and only one mill of 5000 spindles on No. 80s to 100s, recently started.

New England waited about 50 years, until the year 1880, before her manufacturers thought their conditions would warrant undertaking the fine goods and fine spinning.

Now, from what I have observed in my travels South, there is not one location in a hundred that I have seen that has the right conditions to prosecute the spinning successfully of No. 80s to No. 140s, and, in my opinion, the conservative manufacturers themselves do not think the conditions warrant it.

Of course I must admit our Southern manufacturers have proved remarkably apt scholars, and in course of time will aspire for the fine goods and yarns—and build some mills—but they will feel their way cautiously and will wait several years longer before attempting it on a large scale.

But we do not see how they can in the nature of things compete successfully with the old established mills of New England. Of course I am willing to admit that their advantages of longer hours and cheaper labor count much in their favor, but until that labor is educated up to the highest standard of skilled labor they cannot very well compete against New England.

I have been quite freely quoted as being the pioneer in building mills for spinning fine yarns in the South. Now, that depends altogether on what are called fine numbers by Southern manufacturers; but I am willing, however, to admit that I have built the first mills for spinning high grade combed yarns for medium numbers, 20s to 70s, and feel confident they will prove a profitable investment, and prefer to take my chances on them for the next ten years and leave the field on the finer numbers, 80s to 140s, for the other fellows.

Thirdly. Can they make as much money on fine yarns as on coarse and medium numbers?

My answer to this question is: From most careful observations, they cannot make as much money spinning fine yarns as they can coarse and medium yarns. Why? Because their disadvantages will overbalance their advantages. On the latter they can only claim longer hours and cheaper labor, while their disadvantages will be lack of skilled operatives, lack of economy in general management necessary for fine manufacturing, and also lack of intimate experience direct with the consumers.

The Southern states are naturally adapted to the coarse and medium yarns and goods, say from No. 8s to No. 60s. These do not require the skill, experience and economy to produce them as do goods and yarns of from No. 80s to No. 140s.

They also gain on this class of goods on cotton over their Northern competitors, as they can use staple growing close to their mill doors, and thus save freights. While, on the other hand, it will cost them as much for long staple cotton as our Northern mills, and for Egyptians fully ½ cent per pound more. My advice is for the Southern manufacturers to stick close to the coarse and medium counts, which they can make with more profit than they can fine. The South has a splendid future before her in this field, and for the next ten to fifteen years should increase on goods and yarns from No. 40s to 60s.

But there is a very serious problem facing the Southern and New England manufacturers, especially the Southern. What are they going to do with the 2,000,000 spindles which are

to be added for the year 1900? This product must find a market somewhere. "Where?" It is stated by experts in the cotton industry, we can now produce in nine months all we can consume in twelve with our "home market," and some predict inside of one year we shall be over-producing again.

Now, gentlemen of the Southern Cotton Spinners' Association, your association and the New England Cotton Manufacturers' should strike hands at once, and immediately arrange to seek export trade. Sell part of your products to the foreign trade; seek an outlet for at least 25 per cent. of your goods, for the home market cannot take care of these 2,000,000 additional spindles, and now is the time for bold and aggressive action. The American cotton manufacturers should not ignore any longer the foreign trade, but lay plans for securing markets for their surplus products. Don't delay it any longer than possible, and in order to keep the great cotton industry of the United States in a healthy and prosperous condition, our manufacturers should not depend entirely upon the home markets, for if, as has been stated, the cotton mills of this country can produce in nine months all that the consumers here can use in twelve months, and the South is now for this year, 1900, to increase her output fully 33⅓ per cent., it certainly looks as though in the near future we shall be over-producing again. You all know what that means, when you have to urge the buyer for orders.

This can be avoided only in one way; sell your surplus productions to the foreign trade, and thereby prevent a glut of your home markets.

The New England and Southern manufacturers have arrived at the stage where they should be willing to freely consult each others' interests upon broad lines for their mutual protection. They can provide the ways and means, and so regulate the production of their mills that both sections can do a profitable business.

I hope before this association adjourns you will pass resolutions for the necessary step to be taken for the American cotton manufacturers to create a foreign market for a part of the product of their spindles and looms.

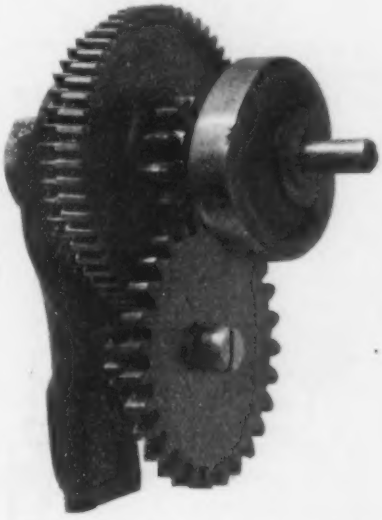
OBJECT LESSONS FOR AMERICAN MANUFACTURERS.

World's export trade cotton goods and yarns for 1899 .....$500,658,000
Great Britain's (lion's share) 66 per cent. $328,325,000
United States (our share only) 5 per cent. $23,566,000

Great Britain exported of yarns and threads value for the year 1899, $57,-187,000.

Rawlins Rove Traverse.

This traverse is the invention of John H. Rawlins, Chester, Pa., and is designed to distribute the wear of the roving uniformly across the whole width of the roll.



With the ordinary traverse, operated by a stud moving in a circle, the wear is unequal, because the motion is much slower, when approaching and leaving the end of the traverse; but, with Mr. Rawlins' device the motion is uniform throughout the whole distance, and the movement is instant-

ly reversed at each end, permitting no dwell and consequent wear at that point. He claims that this results in the covering lasting much longer because, like the old one-horse shay, the wear in all parts being equal, it lasts until every part is completely worn out.

We are informed that this appliance is in successful operation on cotton machinery, and that on coarse work, the advantages over the old form of traverse can be seen in a few weeks.

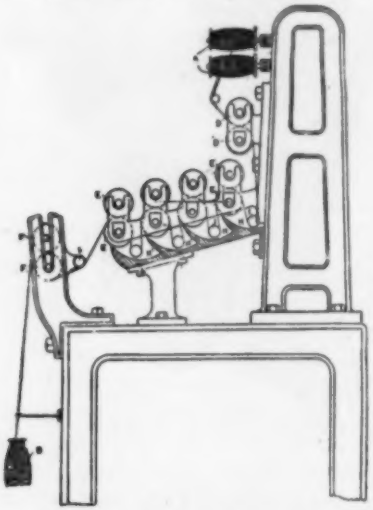
There are other machines in worsted and woolen manufacture such as mules, twisters, spinning frames, spoolers, etc., to which this traverse motion might be applied with good results

Further information can be obtained from the inventor, John H. Rawlins, 1010 Kerlin St., Chester, Pa.

Apparatus for Mercerizing Cotton Yarn on the Twister.

E. AYKROYD.

The single yarn which is to be mercerized is on the upper spools A A, the yarn, which has been mercerized



and twisted, is wound on spool B.

The course of the single yarn is, from the upper spools, between the slightly fluted drawing rollers D D, to the glass guiding roller I in the first dyebath, then between the squeezing, drawing rollers E E to the glass guiding roller J in the second dyebath H; or between the succeeding drawing rollers E E into the first and second baths of water H H. Thence the washed yarn is led over the glass guiding roller I between the hollow drawing rollers F F, heated by steam or water, to the lower spool B, on which it winds itself in the form of twisted yarn.

To prevent the yarn from shrinking during the mercerization, Aykroyd has made the drawing rollers F F of a slightly larger diameter than that of the drawing rollers D D.

Dress Goods.

Peculiar designs, based on the form of the beetle, and lotus and on the Arabic letters, are being employed abroad in ornamenting high class novelties in dress goods.

So far these styles have been confined to the highest and most expensive grade of goods.

Set Screws.

Projecting set screws should not be allowed on moving machinery. They are a source of great danger, being liable to catch the clothing of operatives, and to cause belts to wind around the shafting resulting in serious injury to persons and machinery.

—The signs of reaction in business conditions which have appeared recently, are not confined to this country. Business in the textile trades in England has slackened up somewhat and the same condition exists in France, where the woolen mills at Reims are running but five days per week with a prospect of further curtailment.

WOOLEN DEPARTMENT.

Nature of the Wool Fibre in Relation to its Textile Treatment.

CHAPTER II.

DAVID PATERSON, F. C. S.

Next in importance to the exterior structure of the wool fibre, are its properties, physical and chemical, both of which are of interest to the textile manufacturer.

Its physical properties are three in number, i. e.:—

(1) Hygroscopicity.

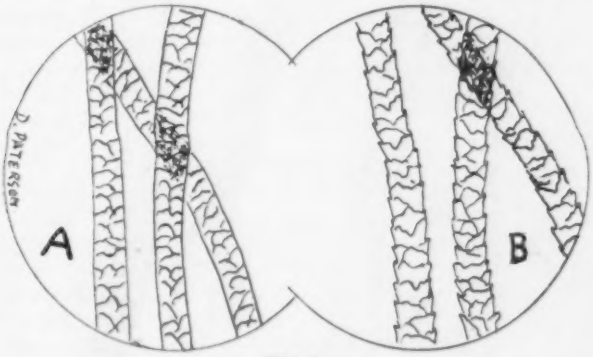


FIG. 1.

(A) A high lustre fibre showing scales close to the stem.
(B) A non-lustre wool fibre showing scales opened at ends.

(2) Elasticity.

(3) Lustre.

(1) Hygroscopicity, or power of absorbing water. Wool is naturally hygroscopic. If raw wool be dried at 212° Fah. (100° Cent.) it will be found to lose something like 18¼ per cent. of its weight, owing to the elimination of the moisture; but, if this dried wool be exposed to the atmosphere, it will gradually absorb the water from the air and regain its original weight.

During dry weather wool contains as a rule about 12 per cent. of moisture; while, in damp and foggy weather, the percentage of moisture rises even as high as 20 to 30 per cent.

Owing to this great variation in the percentage of moisture present in the unwashed wools, it is necessary to adopt a method of drying, or what is termed "conditioning," similar to that employed with silk, and such conditioning establishments are to be found in the important centres of the woolen industries. In this way we are able to fix an official standard of the moisture present in the wool, the amount allowed at present being 18¼ per cent.

When wool is dried at 212° Fah. it assumes a husky, harsh feel and its strength is perceptibly impaired. According to Dr. Bowman, the wool fibre really undergoes a slight chemical change at this temperature, which becomes more obvious at 230° Fah.; while at about 260° Fah., the fibre begins to disintegrate. According to the researches of Persoz, however, temperatures ranging from 260° Fah. to 280° Fah., can be employed without any harm to the wool, if it has been previously soaked in a 10 per cent. solution of glycerine.

When wool is heated to 212° Fah. (100° Cent.) it becomes quite pliant and plastic and may be moulded into almost any shape, which it still retains when cold. This fact is of much interest in the processes of hot finishing of various goods, of embossing velvet ,where designs are stamped on the woven fabric while hot and in the crabbing and steaming of woolen goods, etc.

(2) Elasticity. This important

quality of wool is readily observed by taking a long fibre and stretching it out until it breaks, when it will shrink and curl up into a shorter fibre than it was originally. A fibre, having no elastic properties, will not shrink up under such conditions. This difference may be seen by experimenting with a fibre of cotton alongside of a fibre of wool.

In judging of wools and yarns it is often of advantage to examine their elasticity, because, as a rule, those of least elastic properties have more of the hairy nature, and do not dye so readily.

(3) Lustre. The lustre of the wool fibre is another important feature to be considered, and it varies greatly with the quality of the fibre and the breed of the sheep. Lustre depends upon the transparency of the fibre itself, and the arrangement of the external scales, which we considered in our first chapter. If these scales lie close into the stem of the fibre, and do not project so as to show the serrated edges under the microscope, as seen in Fig. 1, then such a fibre will exhibit a high lustre.

Some wools, such as that of the Lincoln and Leicester, show a beautiful silky lustre or sheen, while others again, like the merino, or the colonial wools, which exhibit their scales conspicuously, do not show a high lustre and are termed accordingly non-lustre wools.

Wools, which have a high lustre, do not dye so rich, deep shades as the non-lustred wools, because the lustre itself is caused by the scales lying close and flat, and therefore they do not so readily absorb the dye solution. Fig. 1 (A and B) shows the typical structure of a lustre and non-lustre wool fibre. Fibre B dyes much more readily than fibre A. Excessive scouring destroys the beautiful lustre of wool, and this must be carefully guarded against. We shall consider this point when speaking of the scouring.

"Kemps" are dead, lustreless fibres of wool, more resembling hair, which, when examined under the microscope, are found not to possess the usual structure of wool. The external scales are generally invisible, or only appear in detached portions, as in our illus-

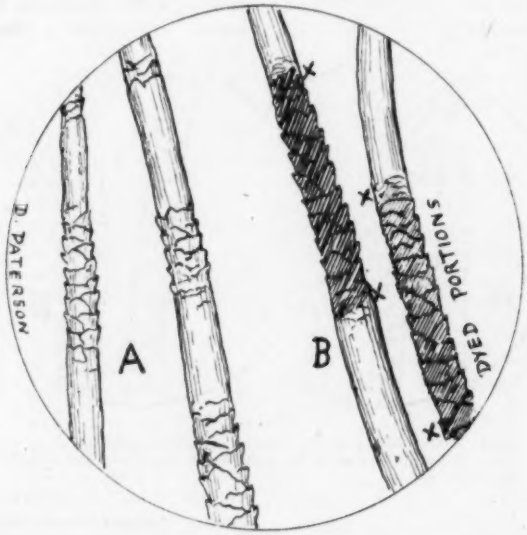


FIG. 2.

(A) Microscopic appearance of Kempy wool fibre.
(B) Kempy fibre dyed; showing only those parts dyed that possess the exterior scales. (Dyed portions shaded.)

tration (Fig. 2). They are generally opaque and dense and have little or no elasticity, felting power, or affinity for dyestuffs. Such fibres are a great trouble to the wool sorter, dyer and manufacturer, and at the present time we are ignorant of the exact cause of their origin. It will be seen from our illustration that some fibres are sound up to a certain length, then become kempy; others are kempy in the middle and good at either end.

Yarns having kempy fibres can never be colored full rich shades, as the kemps resist the dyeing liquor and appear as grey or partially dyed fibres. This not only gives the color a thin or "hungry" look, but, at the same time, spoils the appearance of the finished fabric. Kemps will appear even in the most cultivated sheep and the finest fleece; but in the coarser qualities of wool they are always present.

It is somewhat singular that, though the kempy fibres differ so widely in physical properties from the sound wool, the chemical composition seems to be identical. Their want of affinity for the dyeing liquor must be due to their horny and less penetrable nature. Illustration 2 (B) shows the general appearance, under the microscope, of a dyed kempy fibre, and it will be observed that only in the sound parts of the fibre does the dye take effect. The shading of our illustration represents the colored or dyed portion of the fibre.

Chemical Composition. Wool in the raw state, i. e., as it comes from the sheep's back, is covered with a natural greasy matter termed Yolk, which has to be carefully removed by scouring before the fibre can be used for textile purposes. This natural wool-fat we will consider in our next chapter when dealing with the important subject of scouring.

After the wool fibre has been carefully cleansed from all natural and foreign impurities, it is found to consist of a horny substance, which has been named Keratin. This organic substance is similar in nature to that of feathers, whalebone, horn, etc. Its composition varies slightly in the different qualities of wool, especially in the proportion of sulphur present. The following may be taken as a fair average of the composition of wool:

Carbon 50.00 per cent.
Hydrogen 7.00 per cent.
Nitrogen 15 to 17 per cent.
Sulphur 2 to 4 per cent.
Oxygen forms the remainder.

Sulphur in Wool. One of the most interesting features in the constitution of wool fibre is the presence of sulphur, varying from 1 to 4 per cent. A large proportion of the sulphur can be removed by chemical means without in any way injuring the wool fibre, but it has been found impossible to remove it entirely without injuring the structure and properties of the fibre itself.

The presence of the sulphur is, in many cases, a disadvantage. In dyeing light, delicate colors in the dye-bath, it is necessary, in some cases, to avoid as much as possible, copper or lead dye kettles, as the sulphur in the wool coming in contact with any metal—especially in a neutral dye-bath—causes the formation of a dark colored sulphide of the metal, which destroys the beauty of many light, delicate colors. This fact is well known to all wool dyers.

If an excess of tin crystals be used in mordanting the wool, it ofter acquires a brown tint caused by the sulphide of tin being formed upon the fibre. In the famous Gobelins dye-works—the Royal Tapestry Manufactory of France—when under the direction of Chevreul, the wool, which was to be dyed delicate shades, was first steeped for 24 hours in a dilute bath of milk of lime. After this it was treated in a fresh bath with water acidulated with hydrochloric acid (HCl), and then finally washed in pure water. According to Chevreul, this process diminishes the amount of sulphur present in the wool to about one-half of one per cent. Wool so treated does not become brown when in contact with metals.

The presence of sulphur in wool may be readily shown by a few simple experiments. If wool be placed in a boiling dilute solution of plumbite of soda (oxide of lead dissolved in dilute caustic soda) it at once turns a deep brown and finally black. This is owing to the sulphur in the wool combining with the lead to form the black sulphide, which is precipitated within the fibre. This forms a test for distinguishing wool from silk and other textile fibres.

In the steaming of wool, as in the operations of wool printing, and carpet yarn printing, the sulphur may be readily shown by steaming a swatch with a little acetate of lead (sugar of lead) dissolved in the printing paste. After the swatch has been steamed for half an hour, it will be found to have changed from its original white appearance to a deep brown or black color similar to the previous experiment.

(To be continued.)

Woolen and Worsted Overseers.

The semi-annual meeting of the National Association of Woolen and Worsted Overseers was held at the United States Hotel, Boston, May 16th. Fifty members were in attendance. The report of the secretary showed there were about four hundred active members.

At the meeting, presided over by President T. F. Brennan, there was an interesting discussion on various subjects and many new members were admitted. Papers were read by P. F. Sheridan of Lowell, Mass., F. H. Green of Worcester, Mass., and W. Pickford of Leominster, Mass.

A Soluble Compound from Wool.

When cellulose is treated with carbon disulphide in presence of excess of caustic soda, a reaction takes place, resulting in the formation of a xanthate—the now well-known body viscose.

A corresponding reaction takes place in the case of wool, and a body similar in appearance to viscose, is produced; on longer standing, however, it becomes quite fluid and can be poured from one vessel to another. In color it is dark reddish brown, and unlike viscose it appears to be quite stable under ordinary conditions. It is completely soluble in water, slightly so in alcohol, but in most other organic solvents it is quite insoluble.

The solution, when treated with hydrochloric acid, forms a yellow precipitate with evolution of hydrogen sulphide; on boiling, a further evolution takes place and the precipitate dissolves leaving only a small residue of a brown plastic body. On addition of sulphuric and nitric acids, similar precipitates are produced, which dissolve on boiling; but in the case of nitric acid a reprecipitation occurs on continued boiling, due in all probability to some oxidizing action. The reprecipitated body was not examined.

Like lanuginic acid the "wool xanthate" gives heavy precipitates with solutions of metallic salts. Oxidizing agents, e. g., hydrogen peroxide, give a white precipitate, while permanganate gives a heavy black precipitate containing manganese.

In order to determine whether the substance precipitated by hydrochloric acid was merely reprecipitated wool or some sulphur compound, an estimation was made of the amounts of sulphur in that and in ordinary wool. The results were not, however, conclusive, but tended to show that the relative amounts of sulphur were approximately the same. Another portion of the precipitate was dissolved in acid and then neutralized as closely as possible, in order to see if it resembled lanuginic acid in its reactions. Unlike the latter, however, no reaction took place on addition of picric acid, Nile blue, or any of the acid colors.

This reaction of wool is due to the albumenoid character or constituent of wool, this being shown by the fact that albumen and gelatine underwent the same or a very similar reaction on standing overnight in presence of carbon disulphide and caustic soda; in these cases the action was much slow-

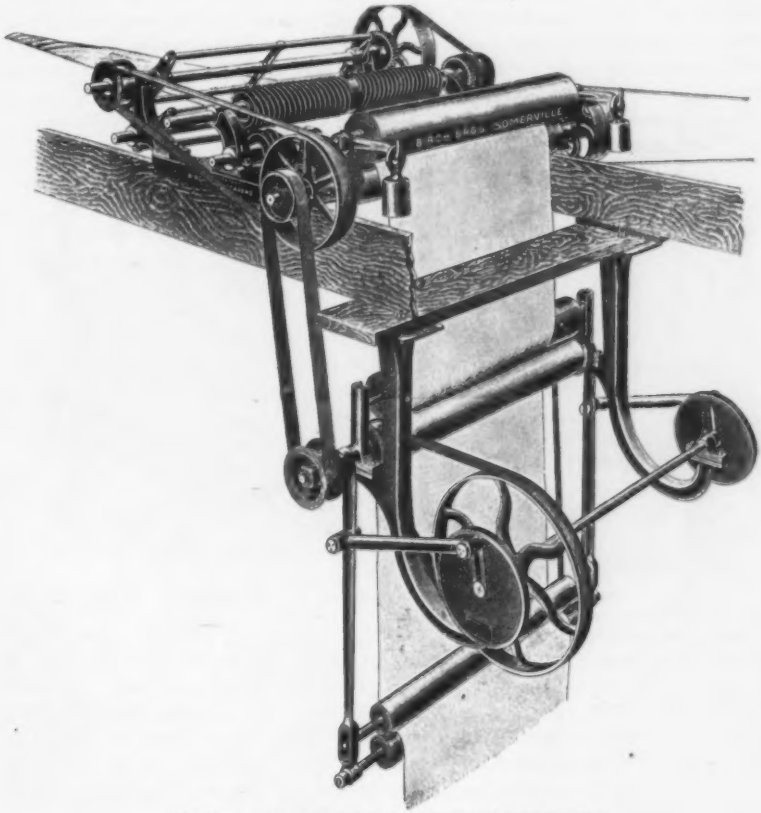
er, the resultant product being a yellowish brown viscous substance, miscible with water, only slightly so with organic solvents. A small quantity of lanuginic acid was similarly treated; this gave a dark brown solution which reacted in the same manner as the wool solution.

These observations indicate the presence of one or more OH groups in the wool molecule, the product being possibly a thiocarbonate or xanthate in which the lanuginic acid takes the place of the alcohol in the ordinary compounds. An alcoholic solution of an alkaline thiocarbonate on treatment with iodine, forms a body of the constitution R . O . CO . S . S . CO . O . R. Iodine also reacts with an alcoholic solution of this "soluble wool." —H. L. Mitchell.

Birch's Scutching and Folding Machine.

In most woolen mills the cloth, when it comes from the washer, is extracted, then opened up and folded by hand. This folding requires two men, is slow work, and occupies much floor space.

In this, as in many other methods of handling goods, the cotton mills have long been in advance of the woolen manufacturers, but this work can and is being successfully done in woolen mills by the machine, of which we here show a cut, built by Birch Bros., Somerville, Mass.



BIRCH'S SCUTCHING AND FOLDING MACHINE.

The machines take up no floor space, as they are attached to the ceiling, and will handle light or heavy woolen and worsted cloths in either

wet or dry state.

At first thought it seems as if this work would necessarily require hard labor, owing to the goods being twisted into a rope form by the machinery in a very irregular way; but it has been found in practice that there are about as many twists to the right as there are to the left, and consequently when any considerable length of the goods is extended, the twists to the right balance those to the left, and allow the beaters and rollers on a machine to open out and fold the fabric.

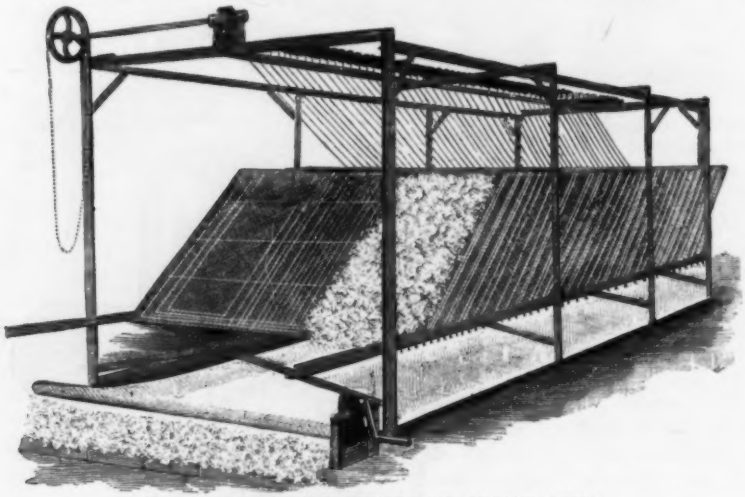


FIG. 1. AN ENGLISH METHOD OF DRYING STOCK.

The goods, coming from extractor or washer, are loaded on trucks and wheeled to this machine, which delivers them on another truck, opened out straight and evenly folded ready for dryer, gig, steaming machine, napper, or other process.

The cockles, creases and curled selvages are straightened out, and the goods present a smooth, even face, and are more easily fed to the machines than when opened by hand.

The machine also acts as a brush, and it is surprising to see how much loose stuff, such as slugs and loose threads, is brushed off of goods in the wet process by this scutcher.

The machine requires no special knowledge to operate, is simple in construction, and can be run by a boy. They are running in some of the largest mills in the country. They can be economically employed in very moderate sized mills.

Birch Bros. also make a rotary sewing machine to sew fabrics of any thickness, wet or dry. A chain stitch is sewn and can be easily withdrawn. Length of stitch can be easily altered from the shortest to ½-inch long.

The feed is intermittent, the cloth being at rest while needle is in and the loop is being made. It makes a real flat chain-stitch, and thread does not cross itself. No revolving looper is used, and there is no winding up of thread around the looper. Machine can be run all the time, and will chain from one piece to another with no trouble. It is simple and easy to work, seldom gets out of order, and is easily repaired.

Improved Dryer for Raw Stock.

The Textile Manufacturer (England), describes a novel arrangement for drying raw stock, which has recently been brought out in that country by Edward Robinson, and which seems to have some features of interest. Nothing about drying is better known than the necessity for spreading out the material to be dried as thinly as possible, so as to expose the

greatest amount of surface from which evaporation can take place. To effect this in the smallest amount of space is of great importance, not only because of the value of the space, but more especially on account of the cost of heating large spaces. When it is further required to fill a given space with a current of air at a fairly high temperature, then the more the work is concentrated within a small enclosure the greater the economy of heat and motive power.

This object is effected by this arrangement of sloping trays to an extent which at first sight is not noticed. Fig. 1 represents sixty wire trays, each 7 ft. by 5 ft., and hence having a total spreading area of 2100 sq. ft. The trays are 4 in. apart, and occupy a space of 20 ft. by 7 ft., or an area of 140 ft. It will scarcely be realized that a floor 100 ft. long and 21 ft. wide would be required to give the surface contained in this one row of trays 20 ft. long.

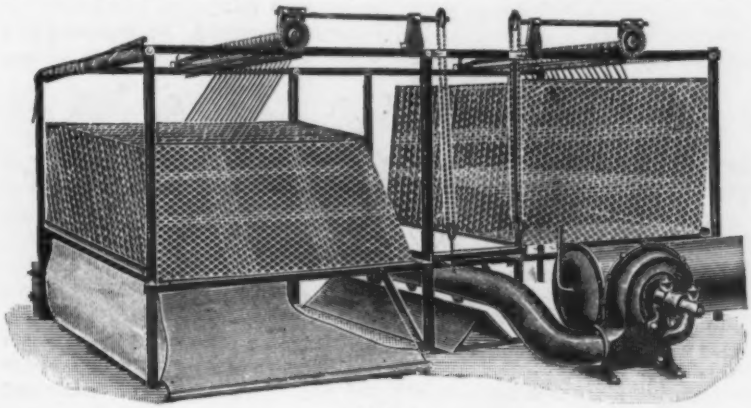


FIG. 2.

It will be seen that these wire trays are hinged at the bottom to parallel bars of angle iron, whilst to the upper sides ropes are attached, made to wind upon a shaft or windlass carried on the top of a frame made of angle iron. The windlass is worked by means of a chain wheel and worm gearing of such differential power as to enable a boy easily to wind up or lower down a row of sixty loaded trays. On commencing to spread the material which is about to be dried, the whole row of trays is let down, reclining upon each other, backs upward. The first of the series is then turned over by hand and the material spread upon it, the other trays being treated the same way in succession. This being done, a few turns of the windlass will raise the whole row of trays up at once to any desired elevation. The wool, cotton or other fibre rests securely with the trays sloping at an angle of 45 deg., or even much more upright than that. Thus the trays are left suspended at about this elevation until the drying is complete. There is a clear open space of about 4 in. between all the trays, thus admitting a free current of air sweeping both sides of the trays alike, and carrying off the moisture very rapidly.

To discharge the trays it is only necessary to wind them up to a perpendicular position, and the material at once falls off and is received upon a sheet conveyer, on which it is carried to one end of the row of trays.

In this arrangement, which is simple, there is a very obvious saving of labor. The heat is obtained by means of a steam tubular heater, which is put by preference underneath the trays, when a considerable temperature is needed. A fan disperses a blast of hot air through a series of nozzles, arranged so as to blow under all the trays alike. Thus, when the trays are boxed in, the current is

forced between them and driven through the material under treatment. One heater and fan will dry two rows of trays standing side by side, as shown in Fig. 2. Two additional rows of trays, however, of the same size can very well be worked with the same heater and fan if raised upon a lattice-work floor over the lower series.

By this means about 240 trays, having a spreading area of from 8000 to 10,000 sq. ft., can be worked at a very trifling expense. The temperature can be regulated at pleasure, so that material requiring to be dried at a low heat can be conveniently treated with this system, whilst a high temperature is always available.

For ordinary purposes the trays are covered with galvanized wire, but in cases where the material has been washed in solutions of acid, etc., the trays are covered with a network of some fibrous material.

If no motive power is available for driving a fan, the material on the trays can be dried by steam pipes placed underneath them, and small installations are made when required to suit any special kind of work, so that the great spreading capacity of this labor saving system can be made use of where motive power cannot always be employed.

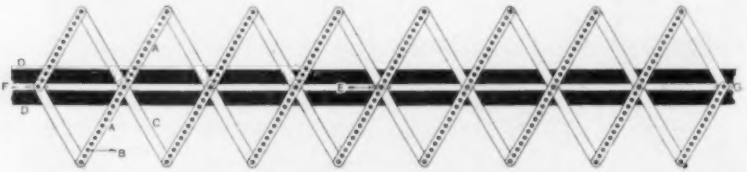
Increasing Fastness of Colors.

Messrs. Geigg & Co., in Basel have found that the colors of cotton dyed with Dis-and Polyaro dyes become more resistant to the action of soap, by an after-treatment with Formaldehyde. The bath contains for every 200 litres of water, ½ kilogram Formaldehyde of 40%.—Farber-Zeitung.

Yarn Evener for Beaming Machines.

Every manufacturer who has used slashers for preparing woolen or worsted warps for the beam, knows of the difficulty in adjusting the warp to the various widths required so that the yarn will be delivered to the loom beam uniformly throughout the width of the warp. Any unevenness causes soft and hard places in the beam, resulting in imperfect weaving and streaky goods.

We notice in The Textile Manufacturer (Eng.), an illustration of an evener device used in beaming jute and linen, which we reproduce. It seems as if this might be adapted for other yarns as well. By means of this device the yarn can be evenly adjusted to the required width. It consists of a number of sections A in which the pins B are fixed. These sections are jointed together in the centre and at the ends to the connecting bars C, the whole resting in a slot in the framework D, and capable of being expanded or contracted at will. By means of a thumb-screw E the centre of the evener may be adjusted to the centre of the beam, and the ends fixed to the required width by similar screws at F and G.



YARN EVENER FOR BEAMING MACHINES.

—The new Gera mill at Passaic, N. J., is nearly completed, and the machinery is being rapidly set up.

Advices from that city state that by a curious coincidence a large number of immigrants, consisting mostly of women clothed in high colored garments, and balancing their baggage on their heads, are arriving daily from the old country. The majority of them are Poles and Slavs.

KNITTING DEPARTMENT.

The Knit Goods Situation.

Perhaps the best way to sum up the knit goods situation in a sentence, is to adopt the negative form, by saying that no substantial increase in prices is looked for in the near future. There is, however, little opportunity afforded for pessimism, in glancing over the market.

The let-up in domestic business the past month was partly due to the lateness of spring, but more to the exceptionally large demands the first three months of the year. The position of foreign goods is as strong as ever, with prospects of becoming stronger and domestic manufacturers ought to profit largely thereby.

To specify: Fancy goods of sensible style seem to be growing in popularity but present conditions abroad are rapidly cutting down the output of lower priced grades. Here is an opportunity for the home producer. Again, some of the lesser markets of the world are complaining of the delays incidental to European orders. Here, once more, is a new chance for Americans.

It is worthy of note that the unexampled strength of the Chemnitz market seems to be communicating itself to Leicester and Nottingham.

This state of affairs abroad seems providential, for the increasing American supply is rapidly outpacing the home demand. The conditions have been hastened by night production, now fast being lopped off.

Indeed one of the most hopeful factors possible, is to be observed in the decided tendency of manufacturers to curtail output, rather than squeeze prices.

As abroad, there is a home leaning toward increasing order manufacturing, a lesser sign of promise.

To particularize: In hosiery, fancies are moving briskly, job lots being quickly snatched up.

Yarns are slow in delivery and, as has been well remarked, this delay has probably been a blessing in disguise, by tending to decrease production.

While it is true that New York prices are below the Chemnitz level the disposition of some retail buyers to take a speculative flyer is not reassuring. Eight times out of ten such a course foreshadows enough of a reaction to pay a handsome scalping profit.

Hand made golf goods in plain colors are increasing in favor, but the demand is necessarily limited and only extra choice styles of unusual finish can hold the ground.

Importers are thoroughly contented over their season's business.

Seamless goods give every evidence of being in healthy condition. Prices and business are steady, fall orders being reasonably numerous. The hardening of the yarn market, following recent weak spot tendencies, is looked upon as likely to prevail until midsummer or later. It ought to be made clear, however, that few have been successful in getting any substantial advances on goods.

Fall business is likely to compare well with the results of any previous year.

Now as to underwear: Unquestionably a lot of heavy weight woolen goods have been left over owing to the mildness of the past winter. Taken altogether, spring conditions have been equally unseasonable. Had not orders been placed at prices several shades under present quotations, many cancellations would be inevitable.

As a matter of fact there are several elements of weakness. The yarn position is steadily approaching a more normal point, although spinners will not admit it. Cotton yarns of low grade as usual, are the first to soften.

The general prosperity, too, has

been over-estimated, although not alarmingly.

As is invariably the case it is cropping out that many duplicate orders have been placed.

A good deal is heard of the argument that present prices mark only the increased cost of raw materials. Against this there are many cross currents to neutralize its effects.

A call, which corresponds to the demand for plain, bright colors in golf hosiery is to be noted in the request for such garments as golf jackets to match, cardinal being a favorite shade.

Advance order business for next year is being pushed vigorously now that yarn spinners have declared their intention of maintaining prices.

Cotton piece goods now being supplied in adequate quantities, yarns are no longer withdrawn from knit goods channels. Consequently, it has been feared that any decided drop in prices previous to delivery, would end in free cancellations of spring underwear orders.

The announcement of the spinners while it does not give any certainty, is not without value, particularly in the light of recent history. But in the words of the sentimental song, "There'll Come a Time Some Day."

The Victor Full Automatic Hosiery Machine.

We present an illustration on the accompanying page of the new full automatic improved Victor knitting machine, manufactured by the American Knitting Machine Co. The features claimed for it, and which commend it most to the mills, where it is already in use, are its great simplicity of construction, durability, large and perfect product. The needle breakage on this machine is reduced to a minimum.

Owing to the simplicity of its construction before referred to, the operator is able to attend to a large number of the machines. It is a full automatic seamless machine, adapted for high spliced heel and double sole, and also for plaiting, changing yarn in heel and toe. The parts are thoroughly interchangeable.

The reinforcing thread is automatically inserted and broken out in heel and toe, and the calf of the leg is automatically slackened, thereby knitting the elastic top, so much desired. In making woolen and merino hosiery, a device can be used by putting a cotton back on wool or worsted hose. The machine is equally well adapted for making ladies' hose (continuous or string work), men's half-hose, infants' socks, and for footing ladies' and children's ribbed hose. The cylinder is interchangeable, and can be removed in an exceedingly short space of time.

Another leading feature of the improved machine is the facility with which an 84-needle cylinder can be replaced by one of 200 needles, or the reverse. Either of these changes require nothing more than an increase or decrease of the number of links in the measuring chain, and the changing of two pawls.

The speed and production have not been overlooked in the improvements recently made, and the results attained in both of these points we understand are giving great satisfaction, to the many mills where the improved Victor is now in operation. When changing from reciprocating to circular movement, the speed is automatically slackened, thereby avoiding the chance of shock to the machine. The structural simplicity of this improved Victor renders it an easy matter to tighten a screw or replace or repair any broken or imperfect part without pulling the machine to pieces. The saving of time, and consequent profit to the mill, is very apparent, the mechanism being very simple. The liability of expense or break-downs is proportionately reduced.

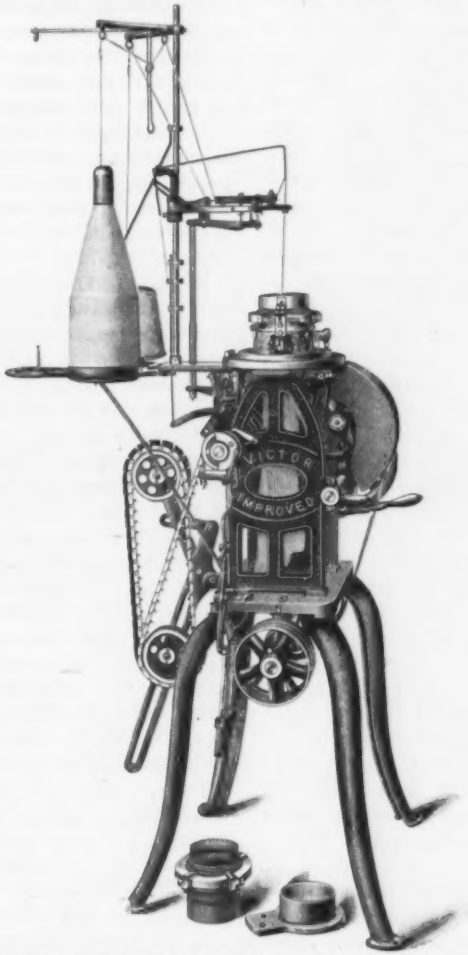
This machine commends itself to the knit goods manufacturers of the country, and the price has been made very reasonable.

The American Knitting Machine Co. has for some time been located in Providence, but they are now in the

process of removing their entire plant to Woonsocket, R. I. This is being accomplished gradually, so as not to interfere with the shipment of their orders, but by July 1st they expect to be wholly established in their new location in the Taft-Pierce Mfg. Co.'s factory building.

This latter concern, which has a wide reputation for excellence of machine work, will hereafter build these machines under contract of the American Knitting Machine Co., and with this arrangement the construction of the new improved Victor machine will certainly be all that the most critical purchaser could desire. This gives them the facilities of this large and splendidly equipped shop, and enables them to fill orders promptly.

Correspondence with the company may be addressed, prior to July 1st, to 115 Wickenden St., Providence, R. I., and after July 1st, to Woonsocket. Their branch sales agents are as follows:



THE VICTOR FULL AUTOMATIC HOSIERY MACHINE.

Louis P. Haight, 109 Lyman Block Muskegon, Mich.; J. G. Wilburn, 38 Forest Avenue, Atlanta, Ga.; and Howard W. Harley, 2515 Germantown Avenue, Philadelphia, Penn. The officers of the company are Wm. Schall, Jr., President; Rudolph E. F. Fleisch, secretary; E. Pavenstedt, treas.

Speed and Production of Spring Needle Knitting Machines.

The production of this type of knitting machine depends largely upon the grade of yarn used. There is a diversity of opinion on this question among practical knitters, owing doubtless to the fact that each forms his opinion under the peculiar conditions existing in the mill in which he is working. Yarn may be better in one mill than in another; consequently, the machines can be run faster and a larger production turned off. The opinion of builders of this class of machinery, on the question of production, is naturally of great value, as it has been their business to observe the working of the machines under all the varying conditions existing in different mills. The variation in the gauge and size of the yarn, and the diameter of the cylinders, renders it somewhat difficult at first to decide as to the proper speed to operate knitting machines.

In a new catalogue issued recently by Messrs. Campbell & Clute, are given interesting data on this point.

Some interval of time is required for the easy and perfect formation of each stitch on the needle. For this reason, there is a limit to the speed at which the machines can be run, but when we consider the immense number of stitches made on a knitting machine in one second, the forming of one stitch seems practically instantaneous. A cylinder 14 inches in diameter, and of 20 gauge, has 600 needles, and when revolving at a speed of 40 revolutions per minute, makes 400 stitches per second, or 24,000 stitches per minute, with one feed; but, if four feeds are used, 1600 stitches per second are made, or 96,000 stitches per minute.

The experience of this firm with their machines has shown that a cylinder 18 inches in diameter can be operated successfully at a speed of from 40 to 45 revolutions per minute. In order to knit the same number of stitches per minute on a 14-inch cylinder as are knit on an 18-inch cylinder, of the same gauge, and revolving 45 turns per minute, the 14-inch cylinder must make 57 6/7 revolutions per minute.

While the quantity of cloth produced per day varies widely, owing to the quality of yarn and other conditions in a mill, it is estimated, that on an average an 18-inch cylinder, of 14 gauge, with four feeds, running 45 revolutions per minute, on 14 gauge yarn, will knit in eleven hours 15 dozens, weighing 10 pounds per dozen. The same cylinder with four feeds, on 20 gauge, at the same speed, on 20 gauge yarn of good quality, will knit in the same time about 11 dozens, weighing nine to ten pounds per dozen.

In Cohoes, N. Y., and some portions of the Mohawk Valley, near there, a system of numbering yarn peculiar to that locality is employed. Three threads of one draw are taken from the jack, and the weight in grains of these three threads, which measure about 6¼ yards in length, is called the grain number of the yarn. Thus, if these three threads of one draw, should weigh nine grains, that yarn is called nine-grain yarn, and it has been found in practical experience that a knitting machine adjusted to 14-gauge work, handles nine-grain yarn to the best advantage. Sixteen gauge, knits eight-grain yarn; 18 gauge knits 6½-grain yarn; and 20 gauge knits 5½ to 6-grain yarn. As there are various systems of numbering yarn employed by different mills, these sizes by grains will not be understood by many until they are reduced to the equivalent in their yarn numbering systems. The nine-grain yarn, by the Cohoes system, is equal to 3 run yarn woolen system; No. 8¾ single worsted system; No. 5¾ single cotton system; or No. 16 single cut system.

Right here, we would say that the existence of so many diverse methods of numbering yarn is quite a disadvantage to the textile industries, and the Textile World will shortly publish

in its 1900 Directory, carefully compiled comparative yarn tables, showing at a glance the equivalent of any size of yarn by any system, in each of the other systems of numbering.

The gauges most generally employed in knitting mills are 16 and 18. The gauge of the work on spring needle machines is determined by the number of leads (2 needles to the lead), in three inches of the circumference of the cylinder. For instance if 20 gauge should be wanted, there will be 40 needles in three inches measure of the circumference of the cylinder, and for 14 gauge, there would be 28 needles in three inches measure of the circumference of the cylinder. In the case of a 14-inch cylinder, the whole of the circumference would measure nearly 45 inches, and in this space, with 20 gauge, there would be 600 needles. This number would not be exact, as it might be found that a few more or a few less would have to be put in in order to exactly fill the circumference.

The space between the needles and the take-up rollers has an important effect upon the running of the machine, and it is desirable that this space should be ample, for in that way much more elasticity is obtained in the knit cloth between the needles and the rollers, owing to the far greater number of stitches in this space. Consequently, the strain is not so severe on the needles, owing to the give and take of the cloth, and there is less liability of overstraining the cloth and loops on the needles, and poorer yarn can be used successfully.

Needle Breakage in Knitting Seamless Hosiery.

This subject opens up a wide field for discussion, owing to the widely varying conditions existing among the different mills, as regards stock, goods and machinery. We have obtained opinions from several practical knitters, in regard to what could be considered a fair allowance for needle breakage, and the replies have been so interesting that we reproduce them here.

A "Foreman," writes:—The subject of the breakage of needles opens up a wide field for argument. The conditions under which the latch needles of today are used and the widely different methods employed in handling the machines, together with the different makes of machines, makes the subject one which can be viewed from widely different points.

For instance we will take the case of a mill employing several machinists, whose duties are to care for and keep in running order a certain number of machines, and a superintendent, who has had little or no practical experience in the care of machinery, and whose sole ambition is to drive these men for a little more than they are worth, the result will be a continual discontent among the men, a high percentage of seconds and a needle record to correspond.

On the other hand with the same machines, the same men, providing the men are capable and conscientious in regard to the interests of their employer, and do not have a little more than is possible for one man to do the results will be much better; for in my opinion the only way to successfully handle knitting machinery, is to keep it in thorough repair, and the speed down where it belongs, and if a machine breaks a needle, not to remove the needle only, but to remove the cause, and to accomplish this there are times when it requires some little time to do this; but once done and in a thorough manner, that ends it; and, the man knows that he will not have to run back to the machine in a few minutes to find more needles broken and in addition seconds and waste made; on the other hand if, after a glance at the machine, and the thought that, well it may not do it again, and I have got several machines, which need my attention more, and I will see it later, the result will be the other extreme.

Then again the different makes of machines will show different results

in the breakage of needles; in that case it is not the care taken but the construction of the machine.

The needles themselves must be taken into consideration; and it is an important item on which a great deal could be said, and which every person handling knitting machinery especially at a high speed, is more or less familiar with.

Then we have the knitters themselves to contend with; to illustrate this, I will take two knitters, both girls and using full auto-seamless machines, of the same make and running 250 revolutions per minute, the machines looked after by two different machinists. Girl No. 1 is a careful knitter, who on breaking a needle, reports it, and allows her machine to stop until examined by the machinist. Girl No. 2 is ambitious to produce a certain amount of work, and on breaking a needle reports it and after waiting a few minutes for the machinist, who does not appear, puts in another needle, and starts the machine, taking her chances on the results. Later the machinist comes, sees the machine is running, makes a hasty examination and takes his chances.

The figures I give you below are the results of a ten weeks run by these two knitters, and are authentic. Girl No. 1, running 5 machines on transfer work, sizes 6 and 7 produces 1784 doz. and breaks 204 needles or approximately 8¾ doz. per needle. Girl No. 2 running 6 machines on the same style work, sizes 9 and 9½ produces 1296 doz. breaking 682 needles or approximately 2 doz. for 1 needle.

Now for the difference in the machines themselves; I will take three different makes and as I am not advertising any particular machine, will style them A, B and C, all working under the same conditions, and all practically on the same kind of work. A produces 3649 doz. and breaks 640 needles or about 1 needle for 5½ doz. B produces 1870 doz. with a breakage of 200 needles, or about 1 needle for 9⅓ doz., while C produces 480 doz. with a breakage of 41 needles, or nearly 12 doz. for 1 needle.

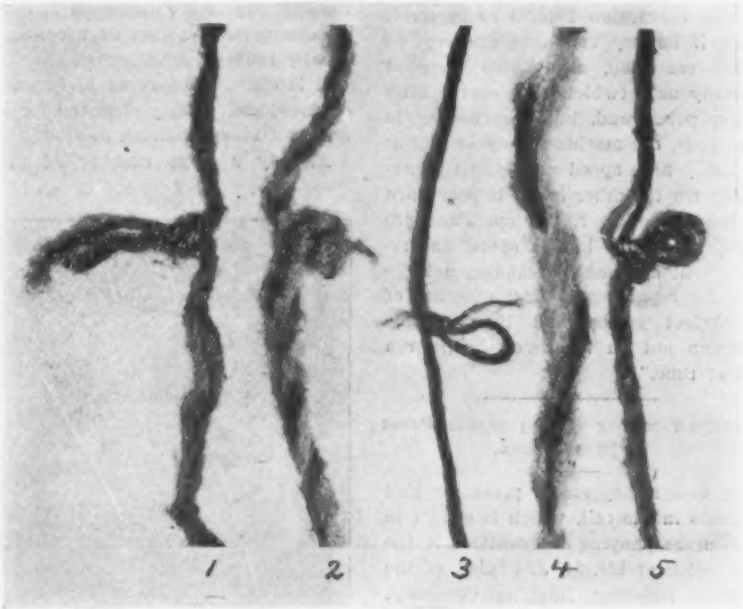
Another case, which comes to my mind, is that of 6⅞ automatics, which were sent on trial to a mill, where I had charge of the knitting, with instructions to run at 260 revolutions per minute. Knowing their speed to be too high and expecting trouble, I started 5 at 255 and one at 225 with the following results. With the 5 at the high speed there was a continual breaking of parts and a corresponding amount of inquiry from office, as to why the parts broke, to which my reply was invariably, the speed is too high for the construction of the machine. After several such replies it was decided to write to builders and inquire if we had been misinformed in regard to speed; the reply was that 260 revolutions per minute was right. A record was kept of all 6 machines with the following results:—The five running at 255, after a run of 6 months showed for each machine an average production of 42 dozen per week, with a breakage of 1 needle for every 6⅔ dozen, while the one running at 225 showed a production of 43 dozen per week and a breakage of 1 needle for every 11⅙ dozen, and of the five running at 255 not one escaped a breakage of some part, while the one running at 225 had not cost one cent for repairs. The stock used on all of the machines was carded peeler cotton yarn.

All of the above goes to show some of the conditions, which must be considered in making an allowance for needle breakage. But in my opinion a plant making 100 dozen per day and handled by a capable man, should, with any good machine, produce 8 dozen for each needle broken.

A hosiery mill knitter sends us five samples of yarn given him to knit, as shown in the illustration, and says:

"Needle breakage depends largely on the yarn, and will add that it also depends upon a lot of stuff which is furnished nowadays and called yarn. I enclose a few samples to illustrate my meaning. This is taken from yarn

which was recently purchased to knit goods. A child just beginning to fly a kite could make better knots than these. As I looked at these samples, I wondered what sort of an idea the manufacturer of such yarn had of a knitting machine and knit goods. In these days of automatics, and the frenzy to buy cheap yarn, we run across rotten yarn, soft twist, bad winding, and poor knots. All of these



SAMPLES OF "KNITTING" (?) YARN.

things have great effect upon needle breakage. When short stock is drawn so fine in the spinning as to hardly hold together, there is only one result, namely, breakage to be expected when it comes to needles running at a high rate of speed. This causes the needles to jump and fall back, and become wedged under the cams.

"I had a good opportunity this winter to see a mill running according to antiquated ideas, and improved the opportunity to make some observations in regard to needle breakage. There were about fifty old hand machines, of three different makes, and forty automatics. They had the old cone-shaped needle bed, and one of the machines had the needles working perpendicularly. The hand machines were installed fifteen years ago, but were still in good condition, as the company had a large and fine machine shop.

"I found that in running the leg or foot, the old hand machine would compare favorably with the automatics, but in the heel and toe, the operator being compelled to raise the needles separately by hand, and push them down in the same manner, the needles did not rise high enough, or go down far enough, to clear the ends of the cams; this resulted in a breakage at the butt. If the butt is entirely broken, the needle, which remains stationary, will not throw off its loop, but the needles on either side will accumulate, making bad work. Being in the heel or toe, it is discovered and remedied. But, in the case of automatics, if the operator is careless, two or more needles are broken at either the hook or latch.

"In the mill spoken of, the breakage

on the hand machine was about 1½ needles per dozen. The cone shaped automatics would average about one needle per dozen, and the machine circular about one needle per five dozen. During this time, the needles in two automatics began giving trouble, on account of worn cams. I also noticed that the greatest breakage occurred in the coarsest, 72 and 84 needle machines, and diminished in the finer.

The conclusion I have come to, is that if hosiery machines are kept in good condition, and yarns of good quality used (which may cost a little more per pound, but are cheaper in the end), the machines may be run at a fairly high speed with small breakage. On the other hand, if poor yarn is employed, or if the machines are operated at too high a speed, the result will be needle breakage, a large bill for repairs, and large quantity of imperfect goods, and the machine thrown out on the scrap heap in a short time."

The New Fisher Rotary Steam Press for Knit Goods.

A new rotary steam press for knit fabrics in the roll, which is shown in the accompanying illustration, is the invention of Mr. M. J. Fisher, of the Fisher Knitting Machine Company, Utica, N. Y.

The two heavy hollow cylinders are heated by steam, which is kept up to the highest efficiency by means of an improved outlet for the exhaust steam and water. This enables the operator to keep the cylinder at a uniform temperature, and consequently avoid the variation of finish, which invariably results from any variation in heat of cylinders.

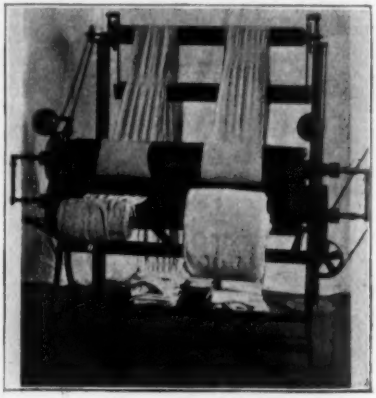
A very effective arrangement is provided for steaming the goods before they are pressed; it consists of a perforated pipe for subjecting the goods to a uniform volume of dry steam before passing through the press rollers, giving a contact of 20 in. on the rollers and allowing the operator to steam as much or as little as desired.

It is claimed that this steaming felts the goods, giving them a very desirable finish similar to mercerized fabrics.

Means are provided for increasing or decreasing the pressure, as may be necessary for the finish required. After the goods are pressed, they are folded evenly. Only one hand is required to run this machine, and with the capacity of 300 dozens in 10 hours on one press the cost of pressing is greatly reduced.

It is constructed so as to be easily operated and readily adjusted for the different kinds of finish desired.

Already a large number of these



THE NEW FISHER STEAM PRESS.

presses have been started; following are the names of a few of the concerns now using them.

Olympian Knit Goods Co., Utica, N. Y.; J. N. Keefer, Camillus, N. Y.; Robt. Ablett, Whitesboro, N. Y.; Oneita Knitting Company, Utica, N. Y.; Halcyon Knitting Mills, Troy, N. Y.; Penman Mfg. Co., Paris, Ont.; Schofield Woolen Co., Oshawa, Ont.; Union Knitting Company, St. Johnsville, N. Y.; Cooper Manufacturing Co., Bennington, Vt. The builders will be pleased to give further information to anyone interested.

SILK DEPARTMENT.

Silk Industry of the United States.

(Continued from May.)

In 1815 a silk trimming factory was established in Philadelphia. A ribbon factory was started in Baltimore in 1829. In 1834 dress trimmings were made in Boston. Sewing silk was made at Florence, Mass., and at Dedham, Mass., in 1835, and these industries had spread until in 1860 New York had forty-four little establishments of one kind or another which employed 1,159 hands and produced $1,154,294 worth of goods. Pennsylvania at that time had thirty-five factories employing 1,559 hands and turning out $1,767,845 worth of goods. Connecticut had twenty-two factories employing 1,137 hands and producing $1,301,400 of goods; Massachusetts, 20, with 781 hands and a product of $1,297,050; New Jersey, 9, employing 716 hands and producing $968,700 worth of goods. In 1870 New Jersey's mills had increased to 28, with 2,790 hands and nearly $4,000,000 production. In 1880 they had increased to 106 factories, with nearly $13,000,000 production, and in 1890 to 132 factories, with nearly $31,000,000 production. In this same year New York had 185 mills and employed 13,000 hands, but produced only $19,400,000 worth, while Pennsylvania produced about the same amount in sixty-six mills, with 9,500 hands. Connecticut's product had risen to $9,800,000 from thirty-five mills, and Massachusetts' to $5,500,000 from twenty mills.

Ribbon weaving for many years was the staple work of the Paterson mills. This had been encouraged by the largest silk importing houses, which found an advantage in ordering ribbons of mills right at hand instead of waiting for orders to be filled from Europe. The duty of 50 per cent. or more was always enough to secure a profitable market for the home product. Ribbon weaving required expert men at the looms, and these men received high wages. The minimum of earnings for these men was $20 a week and more of them received $40 a week, while the bulk of the help, made up mostly of girls, received so little that the whole average of wages in the silk mills of Paterson in 1880 was only $1 a day, while $3 was the average paid in the locomotive works, the other great industry of that city.

The Weavers' Guild was powerful in those days and it was the arbitrary action of this body which finally started the scattering of the silk weaving mills into other parts of the country and particularly into Pennsylvania. The first of the Paterson manufacturers to build elsewhere was the Phoenix Manufacturing Company, which put up the Adelaide Mills at Allentown, Pa., in 1881. A few years later during a long strike, when the strikers dynamited the home of William Strange, one of the pioneer manufacturers of Paterson, the tendency to go elsewhere to escape such troubles was accentuated, and then began the silk-making boom in Pennsylvania. As the manufacturers looked over that State they found it offered many advantages. Silk and its products are light, and freights, therefore, are not of the importance that they are with cotton or wool mills, while throughout Pennsylvania were found scores of towns where the cost of coal was less than $1 a ton, where the local authorities were glad to remit taxes for many years on the mill properties and where there was an abundant supply of the cheap labor which is a necessity of the silk industry. Today, of the 861 establishments in the country, New Jersey has 257, New York 228 and Pennsylvania 172, but in the list of looms and spindles required for the equipment

of new mills in 1898 Pennsylvania led with 1,255 looms out of a total of 2,340 and 37,000 spindles out of a total of 53,000, and there are silk factories in more than fifty Pennsylvania towns, including Allentown, Alburtis, Altoona, Avoca, Bethlehem, Bath, Bloomsburg, Carlisle, Catasauqua, Columbia, Carbondale, Darby, Danville, Easton, Emaus, Ephrata, Eden, East Greenville, Fleetwood, Freeland, Harrisburg, Hawley, Honesdale, Hanover, Hallstead, Lancaster, Lehighton, Marietta, Mauch Chunk, New Holland, Newberry, Philadelphia, Plymouth, Pottstown, Pottsville, Reading, Rockledge, Scranton, Sunbury, Stroudsburg, Taylor, Titusville, Williamsport, Weatherly and Wilkes Barre.

Another field where silk manufacturing may become an important industry is being exploited by a New York house. A mill has been put in operation in Fayetteville, N. C., by the Ashley & Bailey Manufacturing Company, in which young negro labor is exclusively used. The mill has been provided with competent teachers and already from 75 to 100 hands are at work, led by the first pupil, a young negro preacher. The projectors of the enterprise believe that the young people of the negro race are well adapted to acquiring the manual dexterity needed for silk handling, and if this proves true they will go on and build other mills as hands become available. The present mill will employ 350 hands and will do spinning and broad silk weaving.

It is probable that in the future, at least until some great revolution is made in machinery for dealing with silk filaments, that the best interests of the silk manufacturers and of the country will be served by scattering the mills about in many places, rather than concentrating the industry. In this way employment will be given to the surplus labor of the community and especially to lads and lasses who make the most valuable operators because of their deftness of touch, and even the low wages which silk making pays will be a blessing to the people. These wages, according to a table in a recent report on the industry in Pennsylvania, are an average of $1.21 a day for males and 70 cents a day for females in a list which shows the earnings of operatives in all occupations in the State—in which the highest wages are for steam pump makers at $2.44 a day and the lowest are for the female silk workers at 70 cents.

Silk, from the first branch of its production, is essentially prodigal of labor and an article of luxury. It is declared by an expert that it takes more time to build a spool of silk twist than it does to build a modern locomotive, and during much of this time some one's hands must be employed in the operations. It is the amount of time used in raising and tending the silk worms and in reeling off the filaments of the cocoons that has defeated each attempt to introduce silk raising as an industry in this country and will probably continue to defeat its successful introduction.

Every once in a while stories describing the enormous profits to be derived from silk worm raising gain currency. One has recently been going the rounds about a planter near Charleston, S. C., who has an annual income of $6000 to $8000 from this source and has instructed his neighbors in the art, and now a number of these neighbors are adding $800 or $1000 a year to their income by silk raising without interfering in any way with their regular plantation work.

Lest this should start a new silk worm craze, it may be well to call attention to the experiments in this direction that were undertaken by our forefathers, when land and labor were cheaper than they are today and the art of silk worm raising was just as it is now. Silk worm culture was begun in Virginia as early as 1619, and the planting of mulberry trees was required under penalty, by an act of the Colonial Legislature of 1623, while a bounty of fifty pounds of tobacco was offered for every pound of reeled silk

produced. In 1656 the Virginia Colonial Assembly passed an act imposing a fine of ten pounds of tobacco upon any planter who had not at least ten mulberry trees on his plantation to each one hundred acres of land. In 1657 a reward of 10,000 pounds of tobacco was offered to any one exporting £200 worth of raw silk, but there is no record of any one having claimed it. In Georgia and in the Carolinas similar efforts were made to encourage silk raising all through the eighteenth century, but with no practical result, although a filature was built at Savannah in 1749 and Italian operatives were brought to the country to teach the art of silk reeling. The greatest amount of raw silk that there is any record of being raised was in 1759, when 10,000 pounds were produced in the cocoon, equal to about £1000 of reeled silk. Bounties were offered as high as 3s. 6d. a pound for cocoons, or two or three times their market value, but the industry fell off rapidly until it disappeared.

(To be continued.)

Silk Industry in Paterson, N. J.

Reports from Paterson, N. J., state that the silk industry there is suffering from the worst stagnation of business since 1893. Fully 40 per cent. of the silk operatives are idle, and those employed are working on reduced time.

Several causes are named for this depression; silk goods are at present somewhat out of favor as an article of apparel; especially is this the case with ribbons, and in the ribbon mills the conditions are worse; then overproduction is named, but this is only another word for inadequate demand; the high prices recently prevailing for silk and, consequently, for goods, have restricted trade, and manufacturers find themselves in possession of large stocks of high priced silk purchased when prices were soaring skyward several months ago, and when it was reported that there was no raw silk in foreign markets.

Another factor in the situation is the extensive use of mercerized cotton as a substitute for silk.

Defects in Japan Silk.

A meeting of the raw silk division of the Silk Association of America was held in New York, May 13th, to consider the question of defects in Japanese raw silk.

The principal cause of complaint was insufficient twist in the silk, which cannot be discovered in the raw, but becomes very apparent when the silks are soaked.

After discussion by the members, in which doubts were expressed as to the possibility of getting the Japanese trade to agree to a soaking test, the following resolution was adopted:

Resolved, That in view of the increasing trouble in the Japan silks as the result of insufficient twist in the reeling, which does not show in the raw but becomes very apparent when the silks are soaked, the Japanese reelers of silk be urged to place a longer twist on their silks and that buyers in Japan be permitted to use a soaking test for winding, the same to be agreed upon by the buyers and sellers, for the purpose of ascertaining this defect, and that the attention of Japanese reelers be called to the number of double ends in Japan silks and that the reelers be urged to take more care in this particular; further

Resolved, That the secretary be instructed to send a copy of above resolutions to the Minister of Commerce and Agriculture at Tokio, Japan, the Japanese Chamber of Commerce, the Foreign Chamber of Commerce, and the Japanese Silk Guild at Yokohama.

—The prevailing fashion in colors has a great influence on the use of different textile materials, owing to the ability to color some shades better on one material than on others.

Silk Ondule Cloths.

The genuine ondule cloth, which is in such demand in the latest silk fashions, is woven with a special reed operated by special mechanism, both of which have been invented by an Italian designer (Mr. G. Patrone), who is the patentee of this and other ingenious devices. For weaving ondule cloths, the dents of the reed in its upper part are fixed as in ordinary reeds, but in the lower part they are joined three or four dents together and soldered in sections independent of each other, each section ending with a small square heel, all the heels of the successive sections sliding in the grooves of a metallic cylinder inserted in the batten of the loom. This cylinder, about 1½ inches in diameter is provided with a slow rotary motion and grooved with eccentric curves. The heels of the sections of the reed, sliding in these eccentric-curved grooves, are alternately separated or brought towards each other, so that in consequence of the direction given by the sections of the reed to corresponding sections of the warp, the same eccentric curves of the cylinder are reproduced in the cloth itself by the working of the warp. This class of weave has for the first time been

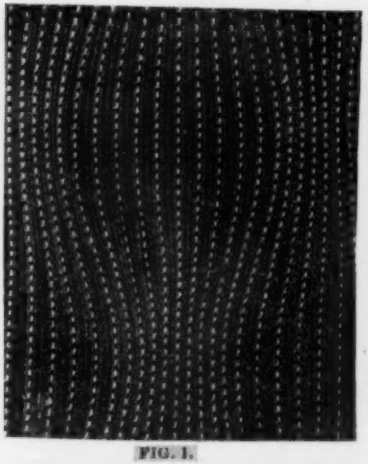


FIG. 1.

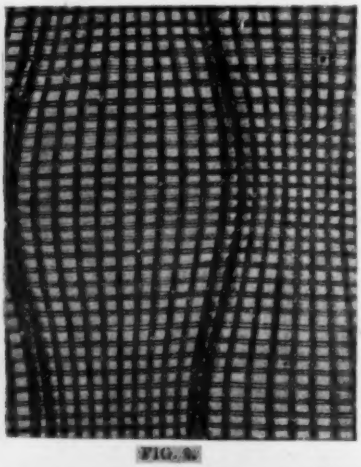


FIG. 2.

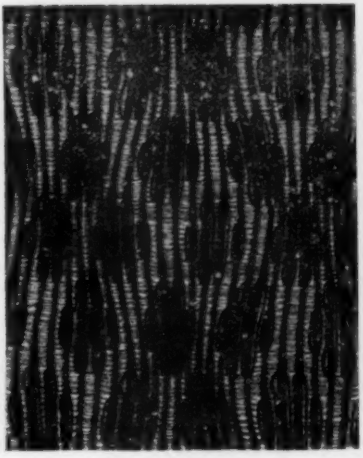


FIG. 3.

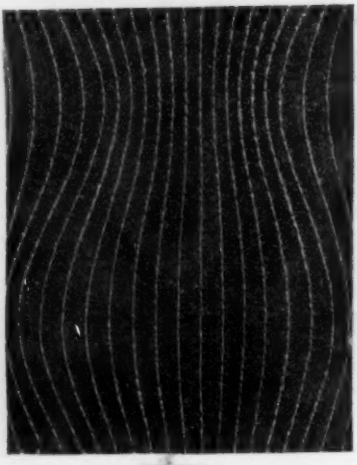


FIG. 4.

practically made use of by a French manufacturer of Picardie (M. M. Bergner), who has secured from Mr. Patrone the monopoly of the system for that part of France. He has made a great success of it for this spring season in high-toned light fabrics of mixed materials, in mercerized cotton, in crepons with jacquards, etc., all for ladies' dress goods. For the spring of 1901 samples are being worked in Lyons by an important manufacturer who runs, beside his French mills, two silk mills in the United States; it is also worked in Germany in a fancy cloth mill for printed cotton goods.

Like many specialties, says the Textile Manufacturer, the ondule effect shows to its greatest advantage in silk cloths, although it is adaptable for employment in almost any class of material which is used mainly for decorative purposes. Cloths of solid weave can be woven on this principle, but open fabrics show the effect better, and it is naturally more adapted to the making of such goods.

Figure 1 is an illustration showing a striped pattern made of silk and cotton. Figures 2 and 3 show the ondule effect applied to gauze fabrics, the last of which is a splendid imitation of a lace effect. A closer woven pattern of mercerized cotton is shown in Figure 4.

Silk Manufacture in the Past.

In speaking of the specializing of work in the silk industry today, Mr. Rometsch, in an address before the annual meeting of the Silk Association of America, was led to recall how very different things were three decades ago. In his boyhood he often watched a jacquard silk-ribbon loom on the upper floor of a small farm house where he had been sent to recuperate. The father of the family, from early morn until late at night, turned the loom by hand. Perhaps some of the ribbon manufacturers of today will remember this phase of the industry—when the old hand ribbon-loom, with the bar in front of the loom, was in vogue, turning, turning, turning, from morning till night. Yet there are some of these looms in use today; fortunately, not in this country, but across the sea they are still turning and grinding out ribbons on this class of loom.

However, the latest advices inform us that this very house industry, which is strongly prevalent in St. Etienne, France, as well as in the surrounding country of Basle, and also in Barmen and Elberfeld, is slowly but surely being supplanted with power looms.

This country has seen very few of these hand looms, although at one time a mill was running with some of the original Basle looms, imported here, having been hand looms over there, but transformed into power looms by the addition of a couple of pulleys, a stud and gear wheels. These are now happily out of service, however, and so we progress from the old to the new.

—A report by the Austro-Hungarian Consul-General at Marseilles states that the silkworm industry, formerly so flourishing, has further retrograded, there having been a steady decline since the year 1881, when it produced 349,481 kilos. cocoons, while it is now only 152,221 kilos. The French Mission to China has already borne fruit. Marseilles and Lyons have established two houses there, which are not only possessed of sufficient capital, but are managed in such a manner that they can successfully represent the national interests. The heavy transport charges, which are too high to compete successfully with those of other nations are, however, a great drawback.

—Among the many congresses to be held at the Paris Exposition this year, is one on the Ramie fibre. An organization has been formed and officers elected.

POWER DEPARTMENT.

ELECTRICITY—STEAM—WATER.

Belting: From Hide to Pulleys.

Abstract from the paper read at the annual meeting of the New England Manufacturers' Association by J. H. Burghardt, Boston, Mass.

Having been asked to give to this convention a few facts in regard to the manufacture of belting, which have come to my knowledge, I desire to say that in the manufacture of the best goods in this line, it is essential in this, as in many other lines, that care be taken in the early stages of material. Very few realize how much care is required in bringing out leather best adapted to this purpose. The selection of hides which is considered the best at this time, is what is called the packers steer, taken from an animal from three and a half to five years old, in good condition, in order that the best results may be attained. An ox hide is liable to be a little coarser grain, and is not so well adapted to belting purposes. The cow hide is not adapted to this use at all, the flanks being too light for the back. A bull's hide is not suitable for belting, as the centre part of the hide is too light, while the outer sides from the centre are too heavy. A steer's hide is uniform in thickness, and is the very best stock that can be used.

It has been found that there is but little strength to the grain of a hide, as most of the strength is from the flesh side, hence there should be as little cut from the flesh part of the hide in currying, as possible. Very few users of belting are aware of the trouble belt makers have to contend with in the matter of hides, and great care should be taken when removing the hide from the animal on account of cuts, of which the manufacturers complain.

On entering the tannery, the first thing is to properly prepare the hide for what we term the beam house, where the hide is soaked, and the flesh removed, preparatory to being treated with lime, to remove the hair and grease. In preparing the hide for the lime it should be, as near as possible, in the same condition as it was when taken from the animal, and great care should be exercised in handling it.

To give you an idea, we might compare it to a piece of honeycomb. If you break one of the cells the honey will run out, and it is exactly the same with a hide, for if one of the cells are broken, the gelatine comes out. After removing the hair and grease from the hide, the lime must be thoroughly extracted, otherwise a coarse brittle piece of leather will be produced. After this the hide should enter a very weak liquor, which consists of a small proportion of tannic acid, and a large proportion of gallic acid. Then it must be fed with stronger liquors, from time to time as it needs it, in order to develop it to the stage it should be. It takes from five and a half to six months to properly tan belting leather, before it is ready for the market. Afterwards it takes two or three weeks to work this through the currying shop in proper shape, and about two weeks to fit it into belting. You will therefore see the length of time required before the belting is ready for the manufacturers.

In the manufacture of cotton goods there is a number of grades and sizes of yarn, and qualities of cotton, and it is practically the same with leather. A great many think that because a piece of leather is hard and firm, it is especially adapted to belting. I disagree with them on this point, for you will find that taking leather which is prepared for sole leather for shoes, the fibre is weakened by the tanning

substance, so that the piece of leather with all proper conditions, and not too firm, will stand a larger tensile strain than a solid hard piece. Of course there is no need of my discussing this point, as all are familiar with the virtue of a very firm piece of leather, and what is considered as a soft piece. As a rule you will find that belting leather is not tanned as it would be for sole leather. Usually sole leather is tanned by sulphuric acid or vitriol, while belting butts are tanned by a non-acid process, and no artificial acids. By leaving pure tanning liquor exposed to the air at a temperature of 60 degrees, it will most likely change from tannic to gallic in about 17 days. I have seen much leather brought out and put on the market, which, owing to the lack of care in preparing and tanning was not worth more than one-half of what it should be. Thus, you see, the great importance of care in preparation.

The leather being thus prepared and ready for belt manufacturers' use, the next essential point is the care in selecting stock that shall be uniform in thickness for the different rolls or belts into which it is to be made. It is impossible to have all hides the same thickness, but it is essential that all pieces entering into a belt shall be as near uniform thickness as possible. Also care should be taken that the firmness of the leather should be much alike in the pieces, as while hides vary in thickness, they also vary in quality and firmness.

There are a number of belt manufacturers now in this country who are aiming to make the very best goods. Every one can make a good belt, if they desire to, as it depends largely on the quality of the stock and the care in making up.

In buying belting about the first thing the manufacturer does is to get out his specifications, and then receive bids from various manufacturers of belts. In many cases this is all right, while in other cases it does not work well, for often the man who is cutting low priced leather can make a low price on belting, and in this way he is quite apt to secure the order, and as you can see, of course the man gets what he is paying for. Very often the belt may come up to the letter of specifications, but when it is put to practical use it will be found to be a much dearer belt than a higher priced one.

Personally I am a great believer in using good goods, and in the majority of cases, it is found to be far better to do so. Very often specifications for belting are made up to a certain length, say four feet, six inches cut from centres, and then expect a belt manufacturer can sell two-inch belting made from centres, which would be an impossibility, unless he receives a special price for it, and even then it is better to make such narrow belting from pieces a little each side of the centre, for you will find that a centre belt as a rule is a little lighter than just one side from the centre, or what is termed a "kidney" cut. The majority of belts, 12 inches or over, single or double, are made from centres, and there are very few concerns that make 8-inch or under, especially in singles, from centres unless so specified. Very often traveling men state that their belts are all made from centres, but if they would say they were made from the centre part of the hide it would seem more reasonable. In making a belt from what we call the centre, there is little or no danger of its running crooked, and even at this point if it is not cut very far down from the centre there is no trouble in this direction. Very often a short lap belt made from pieces down on the side, what we call belly strips, looks as heavy as the very best quality, but when put to use it will be found that it does not last, and will not give the service of a better and higher cost stock.

Very often you wonder what makes a belt stretch, and think that a belt which does not stretch is a good one. In this I beg to differ, for one thing is true, and that is, that a belt should stretch some. A belt properly stretch-

ed on stretchers at a factory in manufacturing is intended to have the stretch taken very thoroughly out, but if the belt is made from certain parts of the hide, which, in the nature of its location is softer, it will from time to time, in fact from the time the pieces of leather enter into the belt, until it has run a long time, continue to stretch. Belt manufacturers try to overcome this as much as possible, and give it all the stretching they consider sufficient.

Again, much depends on the amount of power the belt is required to transmit. Very often an over estimate is made of what a belt will transmit, for I recall places where a three-ply belt should be used, where a double belt was put on and of course the double belt was not able to do the work.

Where there is a very heavy strain, whether high or low speed, I advise a double belt, and if a man buys the best goods a double belt should be made from exactly as good stock as a single belt. Belts made from butts other than leather thoroughly stretched, tanned and curried will not transmit as much power as a belt should, owing to its being hard and firm fibre, and not fitting the pulley as it should. There is nothing, I think, quite equal to a good Oak Bark tanned belt. I consider a good Hemlock tanned belt preferable to a belt tanned with extracts, as extracts do not have as mild an effect on the fibres of the leather as a pure bark tannage. There are some tanneries that have a larger and better reputation than others, and undoubtedly the same is true in cotton manufacturing. You will therefore see that there is liable to be a variation in price of leather, for reasons which the writer has named, and if so, there are causes which bring it about, but experience shows us that the most conservative and best managed concerns in the country as a rule buy the best goods. Why? Because they consider it more economical.

There are concerns, who at the present time, are giving their belts, ordered for main drives, a special running test, at the factory before going out. To illustrate: If a belt 20 inches is required, the stock is cut about 20¾ inches wide, and the belt is made up this width. After it has been completed, it is placed on pulleys, and given a running test, for a longer or shorter time as circumstances will allow, to see if the belt is absolutely straight. Afterwards gauges are placed at each edge of the belt and trued up to the width required by the order, thus giving a stretched belt, full width and true running. This is considered a very essential point, and is much appreciated by users, and it should be taken into consideration when orders are placed.

Belts should be run grain side to the pulley, as the grain will absorb more or less moisture and dirt which accumulates on the pulleys, while the flesh side would coat over, and thus detract from the strength of the fibres.

A belt properly made, in most cases will run with the usual cement, without other special fastenings. Of course there are conditions under which it is desirable to have a belt with the laps riveted or otherwise fastened, but, as a rule, whatever is done to detract from the strength of the belt, by the admission of fasteners, goes so far towards weakening it. If good cement is used, and the belt is properly put together, as a rule it will do the work all right, unless it might be a shifting belt, or as we have said before, unless there are some special conditions where the edges need to be protected. In such cases, of course, we advise fastenings of some description. We think a belt with riveted laps is one of the things of the past.

—A few southern cotton mill hands have recently come north to work in the mills in Fall River. They say they are well satisfied with the change, and that they are now receiving $2.50 per week more for 58 hours work than they received for 70 hours work in the south.

The Future Development of the Steam Engine: A Forecast.

Paper read before the Manchester, England, Association of Engineers, by Alfred Saxon.

It is a fitting time in the closing year of the nineteenth century, or the first year of a new century—whichever may be correct—to estimate the achievements of the nineteenth century.

In our case, it is to observe the progress of the steam engine, with a view of gauging from this evidence the probabilities of its future development. Anyone following the records and traditions which relate to the steam engine, will have their attention drawn to the fact that history repeats itself time after time; in fact, it would be quite true at this stage of its history to say there is nothing new under the sun. There is also a very important truth demonstrated—viz., that great inventions are never, and great discoveries seldom, the work of any one mind; every great invention is really an accumulation of minor inventions, or the final step of a series, so that it is not so much a creation as a growth.

It will only be possible at this time to deal generally with the various types of steam engines, but I may say that in all these various types the direction of general progress is the same. In locomotive, marine and stationary engine practice, the use of higher steam pressures, greater expansion, provision for obtaining dry steam, higher piston speeds, and protection against radiation and conduction losses, have tended in a remarkable degree towards economy.

In other directions than in economy and in the principles of working, wonderful progress has been made in the steam engine. There has been quite a revolution since the commencement of the century in the variety, quality and strengths of the materials of which the engine and steam-producing plant have been constructed; there has also been a great increase in the size and power of these plants. The machine tools for working the materials have been much improved, thus enabling greater accuracy to be obtained, and dispensing as far as possible with hand labor, except for the fitting and adjusting of the various machined parts to each other. Especially has it been possible to produce more accurately bored cylinders, and more perfectly fitting pistons and valves, thus minimizing those losses due to leakage to a very considerable extent. I need only refer to the Willans engine to instance what has been accomplished in this respect.

A better knowledge of the principles of the steam engine has been acquired. The strengths of the various materials available have been properly tested, and the results tabulated. The mechanical draughtsman of today designs the various parts of the engine with the knowledge of the stresses and strains to which they will be subjected, thus enabling the parts to be made more symmetrical, and avoiding undue weight—this is a most important point in high speed and marine practice.

The principal points of progress are:—

1. Higher pressures.
2. Greater expansion.
3. Increase in speeds of piston and rotation.

With reference to higher pressure, early marine practice—like the steam pumping engine and mill engine practice at the beginning of the century—involved the use of steam at little more than atmospheric pressure. The increase in pressure for many years was very slow, but progressive. Since 1870, when boiler pressures were about 75 pounds, there has been a very rapid rise, particularly in marine practice, which at the end of the century has in some special cases reached 300 pounds pressure.

The marine practice of the last half of the century can fairly lay claim to having been the greatest factor in the progress of the steam engine.

Sir William White, in an address as President of the Mechanical Science Section of the British Association, in a review of the progress of steam navigation, says:—

"Sixty years of continuous effort and strenuous competition on the great ocean ferry may be summarized in the following statement. Speed has been increased from 8½ to 22½ knots; the time on the voyage has been reduced to about 38 per cent. of what it was in 1840. Ships have been more than trebled in length, about doubled in breadth, and increased ten-fold in displacement. The engine power has been made forty times as great. The ratio of horse-power to the weight driven has been increased four-fold. The rate of coal consumption—measured per horse-power per hour—is now only about one-third what it was in 1840. To drive 2000 tons weight across the Atlantic, at a speed of 8½ knots, about 550 tons of coal were then burnt; now, to drive 20,000 tons across at 22 knots, about 3000 tons are burnt. With the low pressure of steam, and heavy, slow-moving paddle engines of 1840, each ton weight of machinery, boilers, etc., produced only about 2 H. P. With modern twin-screw engines and high steam pressure, each ton weight of propelling apparatus produces from 6 to 7 H. P. Had the old rate of coal consumption continued, instead of 3000 tons of coal, 9000 tons would have been required for a voyage at 22 knots. Had the engines been proportionately as heavy as those in use sixty years ago, they would have weighed about 14,000 tons. In other words, machinery, boilers, and coals would have exceeded in weight the total weight of the Campania as she floats today. There could not be a more striking illustration than this of the close relation between improvements in marine engineering and the development of steam navigation at high speeds."

I shall not attempt to institute a comparison of the advances of stationary engine practice on the lines of the review I have just quoted, as I feel that the only lines of progress in common are those which I have already indicated.

Stationary engine pressures in 1870 were considered high, even at 100 pounds. The following quotation from a lecture on the steam engine, given by my father in 1873, before this very Association, accentuates this fact:—

"Whilst speaking of boilers, I may just remark that two or three years ago, having taken a contract to supply a pair of compound engines, and my customer having determined upon giving the order for the boilers to a firm who made them their special business, he introduced me to the senior partner of the firm in order that I might explain to him what kind of boilers it was desirable that he should supply. I insisted that they must be plain, practical, simple boilers, and to carry a working pressure of 100 pounds to the square inch. The greatness of the pressure caused him to shake his head, and ultimately he took a week to consider it. At the end of this time we met again; he smiled, and produced his specification, which was accepted."

In both locomotive and stationary engine practice, at the present time, pressures up to 200 pounds are in daily use.

(To be continued.)

—In the East, cotton is still largely dyed in fermentation vats; raisins, dates, and honey being used in place of treacle, woad, and bran. In Europe, cotton is now dyed in so-called chemical vats, such as the "hydrosulphite" vat already described. In cotton dyeing, the vat is used cold, otherwise the preparation of it is the same as that for wool.

—A French patent has been taken out for printing on a first mordanted fabric instead of printing on both mordant and color, and finally steaming. For example, black is dyed by mordanting with chrome and oxalic acid, and then printing on a color containing logwood.

DYEING DEPARTMENT

Dye Recipes for June.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $4.

Recipe No. 81.

Dark Tan on Cotton Yarn.

Tan G W on 100 lbs. of cotton yarn.

Prepare the dye bath with

3 lbs. Tan G W.

(C. Bischoff & Co., 87-89 Park Place, New York.)

25 lbs. Salt.

Enter material at 180° F., bring to a boil and dye at this temperature for one hour, wash and dry.

Tan G W gives a rich shade of tan which is particularly desirable for use on hosiery and webbing.

Recipe No. 82.

Pink on Worsted Yarn.

Fast Acid Eosin G on 100 lbs. of worsted yarn.

Prepare dye bath with

1½ lbs of Fast Acid Eosin G.

(Victor Koechl & Co., 122 Hudson St., New York.)

10 lbs. Glauber's Salt.

4 lbs. of Sulphuric Acid.

Enter yarn at 170°-180° F., bring to a boil and dye at a boiling temperature for one hour, turning frequently.

The bath should always have an acid reaction, as the beauty of the shade is unfavorably influenced if too little acid is used.

Fast Acid Eosin G has excellent equalizing power. It produces a pink which is as pure as that of Eosin, but much faster to light and easier of application. The color also has great fastness to stoving.

Recipe No. 83.

Black on Worsted Yarn.

Nerol 2 G New on 100 lbs. worsted yarn.

Prepare the dye bath with

7 lbs. Nerol 2 G New.

(Berlin Aniline Works, 72 Front St., New York.)

10 lbs. Glauber's Salt.

6 lbs. Acetic Acid.

Enter material lukewarm, raise gradually to the boil and dye boiling for ¾ of an hour.

Over other acid blacks of this class, Nerol 2 G New has the advantage of producing in one bath without any previous or after treatment with bichromate of potash, a black of exceeding great fastness to washing, fulling and light. This dyestuff leaves the fibre in excellent condition.

Recipe No. 84.

Red on Worsted Yarn.

Brilliant Congo R on 100 lbs. of worsted yarn.

Prepare the dye bath with

3 lbs. of Brilliant Congo R.

(Berlin Aniline Works, 72 Front St., New York.)

20 lbs. of Common Salt.

Enter at 180° F., bring to a boil and dye at this temperature for 1½ hours.

The color thus obtained is exceedingly fast to fulling, stoving and light, and is therefore especially adapted to the dyeing of blankets.

Recipe No. 85.

Violet on Worsted Yarn.

Acid Violet F on 100 lbs. Worsted Yarn.

Prepare dye bath with

3 lbs. Acid Violet F.

(A. Klipstein & Co., 122 Pearl St., New York.)

15 lbs. Glauber's Salt.

2 lbs. Sulphuric Acid.

Enter yarn at 180° F., bring slowly to a boil and dye at this temperature for one hour.

Acid Violet F produces a shade

that is very brilliant and comparatively fast to light.

Recipe No. 86.

Black on Cotton and Wool Mixed Goods.

Union Black B Extra on 100 lbs. cotton and wool mixed goods.

Prepare the dye bath with

5 lbs. Union Black B Extra.
(Schoellkopf, Hartford & Hanna Co., 100 William St., New York.)

30 lbs. Common Salt.

Enter material at 140° F., bring slowly to a boil and dye at this temperature for one hour.

Union Black B Extra may also be used for dyeing cotton or wool alone.

It produces a jet black.

Recipe No. 87.

Green on Cotton Yarn.

Phenedene Green G on 100 lbs. of cotton yarn.

Prepare dye bath with

3 lbs. Phenedene Green G.
(Sykes & Street, 85 Water St., New York.)

40 lbs. Common Salt.

28 to 30 times weight of cotton of water.

Enter yarn at 140° F., bring to a boil and dye at this temperature for one hour.

Allow to cool in dye bath for 20 minutes.

Phenedene Green G is faster to alkalies, light and soaping, than the average direct cotton green now in the market.

Recipe No. 88.

Blue on Cotton Yarn.

Direct Blue 2 R B on 100 lbs. of cotton yarn.

Prepare the dye bath with

4 lbs. Direct Blue 2 R B.
(O. S. Janney & Co., 8-10 Letitia St., Philadelphia, Pa.)

20 lbs. Common Salt.

Enter yarn at 180° F., and while turning raise to the boil and continue boiling for one hour. Wash and dry.

Direct Blue 2 R B gives a full and rich indigo shade of blue, and one which is quite fast to light and washing. An after treatment with Blue Stone will produce a shade which will withstand the action of hot starch.

Alum dissolved in the wash water will also render the shade faster, but will tend to redden it.

The dyestuff possesses great coloring power, and as the bath is not exhausted, future dyeings require less dyestuff.

Recipe No. 89.

Khaki Shade on Cotton Yarn.

Compound Shade on 100 lbs. cotton yarn.

Prepare dye bath with

{1 lb. Immedial Bronze A
.15 lb. Diamine Fast Yellow B
075 lb. Diamine Orange B}
(Wm. J. Matheson & Co., Ltd., 182 Front St., New York.)

and

{1½ oz. Soda
1½ oz. Sulphide of Sodium
4½–8 oz. Glauber's Salt} per 10 gal. water

Enter at 170° F., bring to a boil and dye at this temperature for one hour.

The material is then after treated with

1½ lbs. of Copper Sulphate.

1 lb. of Acetic Acid.

per 100 lbs. of goods.

The fastness of the shades produced in this way is excellent to washing and light.

Recipe No. 90.

Magenta Red on Worsted Yarn.

Azo Fuchsine 6 B on 100 lbs. worsted yarn.

Prepare dye bath with

3 lbs. Azo Fuchsine 6 B.
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)

10 lbs. Glauber's Salt.

5 lbs. Sulphuric Acid.

Enter material at 170-180° F., bring slowly to a boil and dye at this temperature for one hour.

Azo Acid Fuchsine 6 B dyes level, and possesses good resistance to alkalies.

It is valuable in wool printing and the dyeing of slubbing.

Recipe No. 91.

Blue on Cotton Yarn.

Tetrazo Navy Blue B on 100 lbs. cotton yarn.

Prepare the dye bath with

3 lbs. Tetrazo Navy Blue B.
(New York & Boston Dyewood Co., 55 Beekman St., New York.)

25 lbs. Common Salt.

Enter the yarn at 180° F., bring slowly to a boil and dye at this temperature for one hour.

Tetrazo Navy Blue B produces a bright shade of blue, and possesses all the characteristic properties of a direct cotton color.

Recipe No. 92.

Red on Worsted Yarn.

Phenylene Red B on 100 lbs. of worsted yarn.

Prepare the dye bath with

4 lbs. Phenylene Red B.
(Sykes & Street, 85 Water St., New York.)

3 lbs. Acetic Acid (added gradually)

1½ lbs. Sulphuric Acid (added gradually.)

Enter the yarn at 180° F., bring to the boil and dye at this temperature for three-quarters of an hour or until the bath is exhausted.

Phenylene Red B produces shades very fast to light, acid, alkalies and fulling on wool, and on silk quite as fast as the ordinary colors. It possesses a remarkable resistance to light.

Recipe No. 93.

Green on Worsted Yarn.

Zurick Green Y on 100 lbs. worsted yarn.

Prepare the dye bath with

2 lbs. Zurick Green Y.
(The Stone & Ware Co., 157 Maiden Lane, New York.)

4 lbs. Sulphuric Acid.

10 lbs. of Glauber's Salt.

Enter yarn at 170-180° F., bring slowly to a boil and dye at this temperature for one hour.

Zurick Green Y produces a brilliant shade of yellowish green, which is very useful in making mixtures.

Recipe No. 94.

Black on Cotton Yarn.

Anthracene Black F on 100 lbs. of cotton yarn.

Prepare dye bath with

25 lbs. of Anthracene Black F.
(C. Bischoff & Co., 87-89 Park Place, New York.)

25 lbs. of Soda Ash.

50 lbs. of Common Salt.

Adding the Soda Ash to the dissolved dyestuff, then boiling up and adding the salt.

Enter the yarn and dye at a boil for one hour. Then top in a bath made up with

½ lb. of Blue No. 8.
(C. Bischoff & Co., 87-89 Park Place, New York.)

Blue Stone equal in weight to ⅓ amount of Anthracene Black F used, and 1 oz. of Acetic Acid to every 2 gals. of dye liquor. Heat slowly to the boil when the bath should be exhausted.

The color produced in this way may be varied from a jet to a bluish black and stands sunlight, washing and cross dyeing.

Anthracene Black F may also be used to produce a brown by using 5 to 15 per cent. of coloring matter, just as much Soda Ash and double the amount of salt, boiling, and after treating in a cold bath for half an hour with an amount of bluestone equivalent to ⅓ of the weight of Anthracene Black used.

Recipe No. 95.

Violet on Cotton Yarn.

Diphenyl Violet B C on 100 lbs. cotton yarn.

Prepare the dye bath with

1 lb. Diphenyl Violet B C.
(John J. Keller & Co., 104-106 Murray St., New York.)

20 lbs. Common Salt.

Enter material at 180° F., bring to a boil and dye at this temperature for one hour.

Diphenyl Violet B C gives a brilliant shade of reddish violet and pos-

sesses the characteristic properties of other dyestuffs of this class.

Recipe No. 96.

Blue on Cotton and Wool Mixed Goods.

Union Blue No. 85 on 100 lbs. of cot ton and wool mixed goods.

Prepare the dye bath with

4 lbs. Union Blue No. 85.

(Anchor Color Manufacturing Co., 462-466 Cherry St., New York City.)

30 lbs. Common Salt.

Enter goods at about 140° F., bring slowly to a boil and dye at this temperature for one hour, then shut off steam and run twenty minutes longer.

This color will also work on cotton as above, only enter at 160°, bring to a boil and boil one hour.

It also works on wool in the same way.

For second and succeeding baths use ⅓ less color and salt.

Dyeing Half-Wools.

The recent rise in the price of wool has made all-wool goods unattainable in certain quarters, where it has been replaced by fabrics of half-wool manufacture. This has given a great impetus to the half-wool industry, and as a natural consequence increased attention has been paid to the dyeing of these goods.

At one time acid wool dyes and basic cotton dyes were almost exclusively used in this branch; but lately, thanks to the efforts of dyemakers, substantive cotton dyes have been forced more and more to the front, and have already insured for themselves a sufficient market to make the one-bath dyeing of half-wool available for every skilled half-wool dyer.

One-bath methods are, however, not to be recommended indiscriminately for all half-wool; for some they are quite inadvisable, especially for costume materials, and similar goods having a shoddy weft.

As wools intended for weft are dyed beforehand, and the sorting, when dyed, much enhances the price of the goods, it will always be the aim of the trade to produce the most lively colors on the darkest grounds, such as lively marine shades, browns, etc., on a blackish bottom. For this purpose the substantive dyes available are, as a rule, not lively enough, and reliance has to be placed on the clearest acid wool dyes, such as Water Blue, Acid Green, Acid Violet, etc., and these must be abandoned for one-bath processes.

At one time it was the practice to use black cotton dyes fast to acids, and such as bled as little as possible on to wool, then to rinse, and finish in a fresh bath with sulphuric acid and the corresponding wool dyes. A still older process is to dye the cotton with myrabolams and iron, first dyeing the wool in an acid bath, and darkening the cotton afterwards in a cold or lukewarm bath. As the cotton does not, as a rule, show much by the side of the wool, it is not essential for it to have exactly the same shade, and it should be slightly darker than the wool.

In addition to these two-bath processes, a one-bath method has been devised which has given very satisfactory results. It consists in dyeing the cotton during the milling process, in the cold, with black. This combination of dyeing and milling into one process obviates the subsequent covering in a strongly acid bath. The following is an example for treating 150 pounds of goods:—In the milling liquid, 13 gals. of soda solution are dissolved with about 2 pounds of Pluto Black B S extra (Bayer); 1½ to 2½ hours' milling are required, and to exhaust the dye as much as possible some concentrated solution of Glauber's salt is put in during the last half-hour. While the cotton becomes in this way fully dyed, the wool is almost entirely protected by the alkalinity of the bath, so that the clearest shades can easily be produced subsequently on the wool by means of acid or sulphonated dyes.

It is possible to stock the milled goods, says the "Leipziger Monatschrift fur Textil-Industrie," and to dye the weft afterwards at any time. Goods with a dark shoddy weft can also be treated in the usual way with bichromate.

The Indigo Question.

After many denials of its possibilities, the indigo trade has come to recognize synthetic indigo as a commercial fact and formidable competitor of the vegetable producer. The indigo planters of Bengal have become more or less alarmed as to the future of their industry, and there has been some agitation of various plans for its protection. Whatever may be the ultimate conclusion of the competition between vegetable indigo and synthetic indigo, and leaving to one side the further perfection in the artificial processes, which may be made with possible reduction of price, it certainly seems as if much might be done by the indigo planters to meet the competition which is confronting them.

When one investigates the subject of indigo culture, it becomes apparent that little or no progress has been made and hardly any changes for hundreds of years. The methods are crude, and certainly admit of improvement. The lack of uniformity which makes each lot of indigo different from every other lot is one of the conditions which would seem might be remedied to great extent. A few of the more advanced students on the question have grasped the situation and are urging the planters in the Indian Government to take steps to improve the condition of affairs, if possible.

Prof. Henry E. Armstrong of the Central Technical College in South Kensington has written several interesting letters to the London Times on the subject, one of which we published in a recent issue, and his latest letter, which follows, is a stirring call to the indigo planters to take hold of the question in a sensible way:—

"It will be remembered that the appearance in your columns, in October last, of an important article calling attention to the way in which the indigo industry in Bengal was threatened in consequence of the manufacture of indigo artificially in Germany, led to the publication of a number of letters in which the subject was discussed from various points of view. Among others I urged that the matter must be treated seriously—that planters must without delay put their house in order and seek in every way to improve the cultivation of the plant, and the extraction of indigo from it. In concluding I said:—

"It would be interesting to know whether a single competent chemist is at present engaged in studying the subject and whether the Indian Government has in any way had its attention directed to the importance of scientific aid being given to the industry."

The answer I received privately was that Mr. Christopher Rawson had visited India and spent some time there on behalf of the Indigo Planters' Association.

On Thursday last, Mr. Rawson read a paper on indigo before the Indian section of the Society of Arts; but this was nothing more than a lengthy statement of familiar facts. The real question of importance at the moment was entirely shirked. We learnt that "Blue cloths found on Egyptian mummies 5000 years old have been found to have been dyed with indigo," and that "the Behar planters had formed a volunteer cavalry corps which had enabled the Government to do away with the cavalry regiment previously stationed at Behar." Photographs of this corps were even exhibited to us on the screen.

No word was said, however, as to what has been done during the past five or is likely to be done during the coming five years; what steps have been taken to organize an effective

opposition to the German manufacturers.

Mr. Rawson expressed a pious opinion that the competition would be successfully met. He further told us that if artificial indigo can be produced in large quantities at such a price as to render indigo planting altogether unprofitable, it can only be regarded by Englishmen as a national calamity. But what will the Germans care how we regard the matter, if they can but secure the field? No altruistic considerations will be allowed to paralyze their efforts. The very importance of indigo—we were told it is worth between three and four millions annually to India—is an element of greatest danger, as it makes the stake all the more worth playing for. It is clear that it is so regarded; in fact, just before attending the lecture I heard it stated—and I have no reason to doubt the accuracy of the statement—that the Badische Co. have already spent half a million on their new plant for the manufacture of indigo. Cautious business men do not operate on this scale without reason.

Have we spent £5000 in the endeavor to set our Indian indigo house in order?

There is no reason to doubt Mr. Rawson's ability, but "One swallow does not make a summer." The problem to be solved is one of great complexity; the conditions of cultivation, as well as those of extracting the dye, have to be exhaustively studied; both time and genius must be devoted to the inquiry, which is one needing scientific skill of the very highest order.

Surely, sir, if the Indian planters are calling on the English Government to foster their industry, the English public have the right to ask: What are the planters doing to protect themselves? Are they taking any really effective measures beyond forming a volunteer cavalry corps?

The manufacture of indigo artificially would in some degree be less of a calamity, perhaps, if there were any prospect of our being able to do our fair share of the work; but unfortunately we seem to have muddled away all chance of that. Yet it is a striking fact that the coal tar color industry and the alizarin industry were both started here, that they flourished here for a time, and that the man who founded them both—Parkin—is also practically the inventor of the process of manufacturing what was for a considerable time the all important material in preparing artificial indigo, viz., cinnamic acid. We are therefore not altogether devoid of the necessary inventive power. The breakdown is on the practical side. Yet we dub ourselves a practical nation. Our failure to properly appreciate and encourage scientific work, and to apply it in our industries to anything like the proper extent, is too terrible to be described in words. Surely we should hearken to advice such as was given by Lord Rosebery at Chatham recently, but not even wait until the war is over "to put our Empire on a business footing"; rather should we at once set to work "to consider deliberately, patiently and scientifically the methods by which we have been accustomed to proceed, and see in what way they have fallen short, and determine to reconsider and revise them."

Apparatus for Mercerizing.

Two recent inventions have been made public, of apparatus for mercerizing; one in connection with yarn dyeing, and the other applicable to mercerizing by itself considered. The first apparatus, relating to yarn dyeing machinery, has for its object the dyeing of yarns and skeins, and in large quantities with means whereby the skeins may be subjected to great tension or a great stretching operation for the purpose of mercerizing cotton yarn or treating cotton yarn with caustic lye and washes to strengthen the fibres and increase its lustre. Mercerization being well known, it will be unnecessary to describe the process at length. Heretofore, the stretching operation necessary in the process could only be applied, it is claimed, to small

quantities of yarn at a time, although various devices have been used, all of which rendered the process expensive, thereby increasing the cost of the yarn. The apparatus consists in the combination, with the dye-tub, of a reel constituted by a pair of large wheels fixed on a revoluble shaft, revoluble removable sticks between the outer rims of the wheels, a pair of smaller wheels loosely mounted on the shaft between the large wheels, revoluble removable sticks between the outer rims of the small wheels, means to rotate the said reel, gearing mounted on the large wheels and adapted to rotate the small wheels relatively to the large wheels when the large wheels are rotated, and suitable means to regulate or control the relative movement of the parts.

The second apparatus for mercerizing yarn has for its object the treatment of threads or other fibrous materials while they are on the doubling-machine in order that, instead of two processes carried out consecutively, the mechanical operation, such as doubling, and the chemical operation of treating with the desired mercerizing liquors is performed together upon the one machine. To this end there is placed in a convenient position upon the doubling-machine two or three or more (as may be necessary) troughs which run throughout the length of the machine, into which troughs is run the mercerizing liquor by any convenient means. Thus in one trough may be placed the mercerizing liquor and in the others water for rinsing the material under treatment.

New Process for Dyeing Cotton.

A new process of deepening the shades of dyes upon one side of cotton fabrics by means of caustic lyes and oxide, has been gotten out by a Swiss, in such a manner that the two sides receive different shades—for example, by use of the same color the one side of the fabric may be dyed darker than the other. For some purposes it is desirable that the stuff be colored on the front side differently from the back side, by which means a considerable economy of coloring-matter may be obtained.

In carrying out this process a caustic solution of an alkali or a salt exercising a strong alkaline reaction, such as aluminate of sodium, in a state of concentration depending upon the color in question and the character of the fabric, is transferred to the side of the fabric which it is desired should receive the deeper color by means of a roller or any other suitable means. This operation has the advantage, compared with all earlier processes for treating fabrics with mordants and the usual mercerizing process, that the shrinking of the fabric or any other physical alteration is avoided, as the contraction which might take place upon the one side is avoided by the fact that the greater part of the fabric is not touched by the mordant liquid. In this process it is unnecessary to use a stretching device, either before the treatment or afterward, as is necessary, to the great disadvantage of the fabric, for preventing shrinkage in some mercerizing processes. By the application of the concentrated alkaline solution to the one side of the fabric this side obtains the property of absorbing the dye more readily than the other side, which has not been so treated, so that even by using very little dye an exceptionally dark and brilliant color can be obtained.

According to the character of the color used the action of the alkalies can be assisted by the presence of metallic salts—such as those of iron, copper, or manganese—and in this manner also any desired shade can be obtained. Care must be taken that the salts be used in such a form that insoluble precipitations do not take place upon the fibres in consequence of the action of the alkalies, and it is therefore advisable to mix the metallic salts with a slight addition of glycerin, glucose, or alcohol to the alkaline solutions, and thus prevent the formation

of an impermeable backing. As it is only of importance to obtain the metallic salts for obtaining the shades, or rather the oxids of same in a soluble form, it is not necessary that glycerin and the like be used for some purposes; but a solution of oxid of copper in a lye of soda or iron or manganese-saccharate may, for example, be adopted. Any oxids arising during the action upon the dyes, as well as the excess of the metallic salts in the solution of alkali, may be removed by passing the fabric after the treatment through sulfuric acid, muriatic acid, or the like. In order to obtain different shades of the same color upon both sides, the salts or alkalies, etc., can be transferred to each side, and the relative intensity of the colors then depends upon the relative strength of the solutions used. If the same amount of substance is applied to both sides, the same color is obtained, but with greater rapidity and brilliancy.

It is self-evident that this process can also be used in combination with the usual "reserve" methods, which do not require to be modified in any manner whatever. For this purpose the mordant solutions of alkali should, preferably, be used at a concentration of 30 deg. Baume or more, and they can, as already remarked, be replaced by solutions of aluminate of sodium with or without addition of lye of soda.

Cotton and Wool Dyers of England Combine.

The cotton and wool dyers of England have formed themselves into a limited association, for the purpose of acquiring and amalgamating into one concern the businesses of forty-six companies and firms. These associated firms, with the two branches of the Bradford Dyers' Association, engaged in warp and hank dyeing, represent about 85 per cent. of the volume of all branches of the trade.

An agreement has been entered into with the Bradford Dyers' Association Limited, under the seal of the respective associations, whereby provision is made for the co-operation of the two associations in matters affecting their mutual interests, and arrangements are made for the acquisition by each of the associations of a considerable holding in the share capital of the other.

The share capital is placed at two million pounds, and the first mortgage debenture stock at £750,000, making a total of £2,750,000. The share capital is placed at one pound each.

It is provided by the trust deed that the unissued balance of the debenture stock can only be issued against the acquisition of additional properties, beyond those mentioned in the valuation, and to the extent of two-thirds of the value of the additional properties so acquired.

The Price for Dyeing in Germany.

For some years past the German piece dyers have been doing business under an agreement as to the prices for their work, but at the expiration of the contract some time ago each firm resumed its liberty of action. Following this change the industry became unsettled, and the price for dyeing was lowered. The Textile Zeitung now announces that owing to the increase of wages and the higher cost of dyestuffs and fuel, the dyers in the Rhenish provinces consider the time opportune to make a new agreement and raise the price for dyeing. The most important dyers have joined the new agreement, and the Dyers' Union thus formed has addressed a circular to the trade, notifying them of the new price-list, which took effect on May 1st. The increase is quite large and will materially affect the finishers of piece dyed goods, such as satins, serges, pongees and bengalines.

—It is the custom in Germany for many of the larger industrial concerns to furnish their shareholders with a printed pamphlet explaining the course of trade generally during their financial year.

QUESTIONS AND ANSWERS

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

Printing Underwear in the Roll.

Editor Textile World:

The writer saw an article in your magazine, relative to printing underwear in the roll giving the same effect as printed cotton piece goods. Would you kindly give the names and addresses of any parties who successfully do this work?

D. W.

We have answered by mail, giving the names of several firms who do this work.

Book on Dyeing.

Editor Textile World:

Will you please inform me as to the best book, both theoretical and practical, on dyeing with aniline colors?

S. W.

We would recommend the following works to our correspondent: The Dyeing of Textile Fabrics, by J. J. Hummel, price $2; and, Manual of Dyeing, by Knecht, Rawson & Loewenthal, price $15. They are both good books, the last named being a more elaborate work, going into the subject in greater detail. It is composed of three volumes, one of which is a collection of dyed samples. We can furnish either of these works, if desired.

White Clippings for Sale.

Editor Textile World:

We would thank you to kindly furnish us with the addresses of some concerns who use white clippings or rags, to whom we could sell a good many nice white clippings, as we have a large quantity on hand, being manufacturers of cotton jean drawers.

Hargrave & Leak.

Wadesboro, N. C.

We have given several addresses by mail, and others who are interested can write direct.

Matting for Church Aisles.

Editor Textile World:

Will you kindly inform me where I can obtain the material which is used for aisle matting in churches, halls, etc., also cost of same?

J. V.

Coca Fibre and Natier are the two kinds principally used for church aisles. The former is more durable, and somewhat more expensive. We have given our correspondent by mail the addresses of several dealers in these goods.

Changing the Weight of Fabrics.

Editor Textile World:

In one of your issues of the Textile World we saw an article showing how to fill tweeds, to make them appear heavier, without injuring the fabric. Kindly send us this receipt for one of our mills.

B. F.

We published articles in the issues of December, 1894, and May and June, 1896, on the subject of changing the weight of fabrics without changing their appearance. These articles give the rules for making calculations, and contain much valuable information on the subject. When it comes to a particular case, such as our correspondent's, the fabric itself and all of the circumstances connected with the case must be carefully considered before any changes can be prescribed. The fabric sent us handles a little sleazy, and if only a small additional weight was required, in order to give the fabric a firm, clothy handle, without changing its appearance, the problem would be very much different from what it would be if it was desired to change it into a regular heavy weight. In a general way, we can say that as the fabric is now made with a plain weave, it would not be advisable to increase the weight materially by changing the size of the yarn, or increasing the number of threads per inch, as such changes would result in a fabric which would be so tightly woven that it would have a hard feel, and difficulty would be found in weaving. A small addition, however, to the weight, could probably be secured in either of these two ways, viz., by increasing the number of threads per inch or the size of the yarn.

Yarn Calculations.

Editor Textile World:

Will you please state the price, and where it may be obtained, of the book entitled "Collection of Designs for Textiles," a review of which appears in the May issue of the Textile world?

W. E.

The price of this book in Paris is 105 francs, or about $20. We have informed our correspondent by mail where it can be obtained.

Book Wanted.

Editor Textile World:

Do you know of any textile book which will give information on yarn and cloth calculations, designing, structure and reproduction of fabrics, particularly in woolen and worsted fabrics? I am after such information as would be of use to a dry goods merchant and salesman in a commission house.

J. H.

We do not know of any book published which gives information on cloth calculation, designing and reproduction of woolen and worsted fabrics, for the use of dry goods and commission men. The books on this subject are designed for the use of manufacturers, and contain so much of a purely technical nature, and employ so many technical terms, that they would scarcely be intelligible to one who was not familiar with mill work and terms. Wool Manufacturing, by Beaumont, price $2, and Textile Calculations, by Posselt, price $2, are two good books of this character. It has been our experience that such information in regard to fabrics is not to be found in any book, as the problems coming up in a commission house require to be solved by one who not only understands theoretically how fabrics are constructed and changed, but also possess such a practical knowledge of the subject as would enable him to meet the special requirements of each case. We can furnish either of the above books.

Black on Cotton.

Editor Textile World:

Can cotton yarn skein be colored black cheaper by any aniline process than with logwood? If so, can you give us the process? Please give us the cheapest formula for black, using logwood.

M. C.

We believe there is no aniline black process for cotton that is cheaper than the logwood process. There are several processes of coloring aniline black on cotton, the cheapest of which is slightly higher in cost than logwood, and is not any faster than the logwood black. It possesses the merit, however, of being easily applied, and in coloring it, the services of a skilled dyer would not be necessary. The process is very simple, and any dealer selling the material would send instructions for its use, at the same time. The more expensive aniline black processes, of which there are several, produce a more permanent color. The cheapest formula for an ordinary logwood black on cotton requires the use of a standing bath, in which logwood, blue vitriol and soda are introduced regularly, to keep the strength up to the required standard. This process results in a black which has considerable dust left in the stock when it comes from the dyebath.

Lanolin from Wool Grease.

Editor Textile World:

Please give me some information in regard to the extraction of Lanolin from wool grease, and where I can get the machinery for the manufacture of the same.

D. F. W.

Lanolin is purified wool grease, and is used in the manufacture of perfumery, ointments and hair oils, on account of its power to retain the odor of perfumes for a long time without loss.

The method of purification consists in washing the wool grease in warm, running water to remove the soluble matter; the grease is then melted in hot water, in which a small quantity of salt and alum, or caustic soda, has been dissolved; the grease is then skimmed from the water and cooled, and afterwards heated with about one one-thousandth part of benzoin added, to prevent rancidity.

Lanolin sells for about 80 cents per pound, but the demand is limited, and we would not consider it advisable to enter into its manufacture on a large scale. There are no regular manufacturers of the apparatus required for the manufacture of Lanolin, which is similar to the tanks and mixers used in the purification of grease for the perfumery trade.

Mercerizing Cotton Yarn.

Editor Textile World:

Will you kindly give me a recipe for mercerizing cotton yarn?

D. J.

The process of mercerizing cotton yarn consists in subjecting it to the action of caustic soda, 50 deg. Tw., at a temperature of about 60 deg. F., for about 15 minutes while held under tension. It is extracted and washed, and then put through a neutralizing bath of sulphuric acid, and afterwards thoroughly rinsed. The effect of caustic soda on cotton has been known for fifty years, but it was not utilized until recently, owing to the great shrinkage which it caused to the cotton.

Within a few years, it has been dis-

covered that by mercerizing the cotton while under tension, the shrinkage is avoided. We have recently published articles on mercerization, in which the subject has been treated with considerable detail. You will find such articles in the December, 1898, issue; February, 1899; September, 1899; December, 1899; and February, 1900.

The success of mercerizing depends largely upon the machinery employed and the care in the manipulation of the cotton. We would advise mills to be cautious in undertaking mercerizing yarn for their own use, as we think the best results can be obtained by firms who make a specialty of this business, and are equipped with the latest and best facilities. Many attempts by unskilled and inexperienced persons to do this work have been attended with unsatisfactory results.

Middling Cotton.

Editor Textile World:

Please inform me what the term "middling" is as applied to cotton.

Knitting.

Middling is a name given throughout the world to one of the standard grades of American cotton. These different grades are middling fair, good middling, middling, low middling and good ordinary.

Size of Doubled Yarns.

Editor Textile World:

We would thank you to inform us how we can find out the size of two or more different numbers of yarn that are doubled together; for instance, we are now using a No. 8 and a No. 24 for a certain hose. What number of single yarn do the two equal?

Double.

The size of doubled yarn is found by dividing the product of the two single numbers by their sum. In the case you mention, 24 multiplied by 8 equals 192. 24 plus 8 equals 32, and 192 divided by 32 gives 6, as the size of the doubled yarn. If three threads are doubled, the size of the combined three can be found by following the same method, using the combined size of any two of them and that of the third one in the calculation.

How to Become an Overseer.

Editor Textile World:

I desire to become an overseer of either weaving or spinning in a woolen mill. Which do you think would help me the most, a course of study in the Correspondence School, at New Bedford, or studying some good books? What is the best course for me to pursue, and will you recommend some good books for me to study?

K. C.

We think that a course in the New Bedford Correspondence School will be very valuable. We would advise you, however, if you desire to become an overseer of either weaving or spinning, to secure a position where you can learn to fix and take care of the machinery. At the same time, you could take up this course in the correspondence school.

We would also advise you to read all of the books that you can secure, bearing on the subject of either spinning or weaving. Ainley's "Loom Fixing," which will shortly appear, would be a good book for this purpose; also, "Woolen and Worsted Cloth Manufacturing," by Roberts Beaumont; and "Woolen Spinning," by Charles Vickermann. It is essential that you combine practical experience with the theoretical knowledge, which you can obtain from schools and books. We can furnish any of the above named books, or any others desired.

Book on Wool and Wool Combing.

Editor Textile World:

Will you kindly inform me if you can furnish "Wool and Wool Combing," by John Burnley, and at what price?

W. J.

The price of the above book is $3.40, and we can supply it if desired.

Cotton Yarns.

Editor Textile World:

Will you kindly inform us what are Peeler, Sea Island, Egyptian and Peruvian yarns?

B. T. H.

These yarns take their names from the kind of cotton used in their manufacture. Sea Island is the finest cotton grown. It is raised on the islands off the Southern Atlantic Coast of the United States. Egyptian and Peruvian cotton, as their names indicate, come from Egypt and Peru respectively. The former ranks next to Sea Island cotton in spinning qualities and length of staple. Peruvian cotton has a fibre very much resembling wool, being curly and rough in appearance, and is used a great deal in mixtures of wool and cotton. Peeler is the name given to a high grade of American cotton, which resembles short Florida Sea Island cotton.

New Publications.

Our New Prosperity. By Ray Stannard Baker. New York: Doubleday & McClure Co. In this book the author gives an account of the prosperous business conditions of the United States today. It is written in a clear and popular style. Statistics are dry reading even when they tell the story of prosperity, but in this work the author illustrates the statistics by diagrams, which impress the reader's mind at once with their true proportion. It is an interesting book.

The American Directory of the Knitting Trade: Philadelphia, Pa., Textile Record Co. Price $2.00. The 18th edition of this well known work has just been issued. It contains a directory of the knit goods manufacturers in the United States, Canada and Mexico, giving size of plant, officers, buyers, etc., and a list of the jobbers of knit goods in the United States.

It is of a convenient size and will be found useful by all who deal with the knitting trade.

The Year Book for Colorists and Dyers. By Harwood Huntington. Edited by Herman A. Metz, New York. We are under obligations to Messrs. Victor Koechl & Co. for the second volume of this work. It presents a very instructive review of the progress during the past year in dyeing, bleaching and finishing.

Under the head of New Process in Part 1 we find an account of recent improvements and latest patents in mercerizing. The question of Synthetic vs. Natural Indigo is considered at length, and the author gives the latest developments in wool scouring, dyeing by electricity, purification of water, photographing on textiles, waterproofing, bleaching and dyeing, besides an extensive list of receipts, formulas, etc., from various processes of manufacture.

The second part of the book is devoted to a review of the latest publications in English, French and German on dyeing, bleaching and finishing.

In Part III., entitled Standard and New Methods, we find analysis of dyestuffs, quantitative color tests, tests for indigo dyed goods, and for the fastness of colors to fading influences, tests for wool oils, soaps, etc.

Part IV. is devoted to sundry subjects of interest, such as poisonous and non poisonous dyes; a list of chemicals used in dyeworks, with their impurities; removal of vapor from dyehouses; flax, hemp, jute and teasels; together with several useful tables and many other things of great value to manufacturers and dyers, but not generally known on account of their recent discovery.

Part V. is a very complete alphabetical list of dyestuffs. A modern color works is described in Part VI.

An index renders the work of easy reference. We have mentioned but a small part of the contents of this book, which should be in the possession of every dyer and manufacturer.

Dr. Huntington has transferred his interests and copyright in this and future issues of the Year Book to Herman A. Metz, who proposes to continue its annual publication.

It is not devoted to the exploiting of any particular line of goods, and special brands are mentioned only as required to properly present the subject to the readers.

Prevention of Loss by Fire. By Edward Atkinson, LL. D., Ph. D., and president of the Manufacturers' Mutual Fire Insurance Company. Boston: Damrell & Upham. This is a work of 95 pages, giving in an interesting form a partial account of a record of fifty years of factory mutual insurance. Thirty-five of these fifty years have been passed by the author in the service of the Boston Manufacturers' Mutual Fire Insurance Company, and he is, therefore, well fitted, by his experience, to treat this subject exhaustively. Of course, it could not be so treated in a book as small as this, as it has been found the mutual fire insurance business is necessarily connected with almost every known science. The author's love of detail and disposition to investigate thoroughly, and accept fearlessly what he considers to be the truth, wherever he may find it, has furnished the requisite for the successful conduct of the mutual insurance business. The facts are what are wanted, and the only thing that is wanted, in this business.

The account of Mr. Atkinson's experience given in this book, forms a very instructive, and at the same time, entertaining, story. It begins with an account of the inception of the mutual insurance companies in New England, giving the names of the founders and first officers, their methods, and the extent of the business in the early years. It then traces the evolution from a small beginning to the present time. Many interesting incidents are related, connected with Mr. Atkinson's service in this company, and a perusal of the book cannot help but strengthen the opinion of every observing man, as to their immense fire losses from causes easily prevented. One gets the impression from the book that the proper conduct of mutual insurance business requires the service of trained experts in every branch of science, as well as the detective ability of a Sherlock Holmes.

In connection with expert assistance, Mr. Atkinson acknowledges his indebtedness to those who have helped him and worked with him in the evolution of the science of the prevention of fire loss, and the names of those most prominent in technical research will occur to those familiar with the work.

This book will be of great value in showing clearly that the interests of the insured and the insurance companies are identical, and it deserves careful perusal by everyone interested, not only in factory insurance, but in fire insurance on all kinds of property. We are confident that if the lessons which it teaches are carried into practice, it will result in a marked decrease in the enormous destruction of property by fire which now occurs every year.

Northrop Loom. Draper Co., Hopedale, Mass. This latest addition to the literature on the Northrop loom gives an account of the machine from its conception to date.

The book has many illustrations of the various looms made by the Draper Co., giving a history of the invention and development of the filling, changing and

warp stop-motion devices and a treatise on the construction and operation of the Northrop loom today.

Conversion Tables of Foreign Weights, Measures and Moneys. Philadelphia Commercial Museum. A small, but very valuable assistant to all engaged in foreign trade. It gives the metric equivalent of our measures of length, surface, capacity and weight, and the equivalent in our units of measure, of the various weights and measures used in foreign countries.

To the foreign merchant such terms as gallon, bushel and pound are as strange as the names of the many foreign weights and measures, such as arraba, fanega or catty are to us. No business can be done until both parties understand each other, and it is the purpose of this little book to effect this understanding. It contains a table, giving the value in U. S. money of foreign coins and currency. It is being distributed free among American manufacturers and merchants.

Riedler's Pumps. Chicago: London. Fraser & Chalmers. A catalogue of the various types of pumps manufactured by this firm, with illustrations of pumping plants erected by them in various parts of the world. Several valuable tables are given, relating to loss in pipes by friction; sheet iron pipe; water heads, weights and pressures; water wheels; weir measurements and capacity of tanks.

Mechanical Ventilation and Heating by Forced Circulation of Warm Air. By Walter B. Snow. This is a lecture delivered November 19th, 1899, at Sibley College, Cornell University. The subject is very important, and the attention given to it is constantly increasing in all quarters. The evils of poor ventilation are very great in public buildings and workshops, where large numbers of people meet together and the necessity for pure air is greatly increased. In many of these public places the primitive method of opening a door or window is still employed, when the air gets too bad. Mr. Snow shows in this lecture that rooms can and should be ventilated by intelligent systematic methods.

Charts are given, showing the relation between temperature, circulation and condensation, and the book contains cuts and descriptions of installations in various parts of the country. It is published by the B. F. Sturtevant Company, Jamaica Plain, Mass., from whom it may be obtained on request.

Industrial News.

—The new power plant of the Electric Street Railway Co. in the city of Mexico is the finest in that country. American machinery is used entirely. The oiling system was ordered of The Burt Mfg. Co. of Akron, Ohio, manufacturers of the Cross Oil Filter.

—The Germantown Hosiery Machine Works, 5122 Wakefield St., Germantown, are very busy at present, manufacturing their new double and single Germantown skein winders. The bobbin made by these machines has given very good satisfaction in the mills where it is used. It is working on cotton, woolen and worsted yarn, in some of the largest mills in the country.

The bottom runners are so made as to be easily adjusted according to the yarn used. The machine is 12 feet long, and one operator runs four ends. Mr. George W. Lindley is the proprietor of these works, and he has made some improvements to the machine. The following are a few of the manufacturers using this winder: West Bros., Plymouth, Pa.; Chas. Chipman's Sons, Black Diamond Knitting Mills, Evans & Stonely, Woodcock Bros., and Why Brothers.

Stephenson Manufacturing Co.

May 29th was a great day for Albany and for this company, as Buffalo Bill's Wild West Show was in town.

The Stephenson Mfg. Co. were made cheerfully aware of the fact by receiving a call from the chief electrician of the show, who carefully fished out from an inside pocket one of their old circulars, which he stated he had carried around with him for some time, anticipating the pleasure of buying Bar Belt Dressing at headquarters when he reached Albany.

He stated that some time ago he ran across their preparation in New Jersey, and that it was without exception the best thing of the kind he had ever found, as it was so easy to carry around, and where they were setting up their plant in a new place every twenty-four hours, he found it was not necessary to be very particular as to the amount of tension he put on the belts, so long as he had a stick of the Bar Belt Dressing near at hand.

As he expressed it, about all he had to do was to threaten that belt with an application and it would stop slipping at once.

Mill Brushes.

S. A. Felton & Son Co., of Manchester, N. H., are getting out a new mill catalogue showing the great number of styles in brushes they make for mill use. Every conceivable want that manufacturers may have in the brush line is supplied and often anticipated by this enterprising firm. It will be well to send for a copy of this catalogue, so as to receive it as soon as it is issued.

New York Blower Co.

People will not stand being cold because it is uncomfortable, but they will breathe foul air because its bad effects are not so evident at the time; but of those two important operations, heating and ventilation, the latter is perhaps the more important.

Heating and ventilation by a forced draft of air is being generally recognized as the best method for many reasons. It is effective, economical, easily regulated and reduces the fire risk and insurance rates.

The New York Blower Co., 39-41 Cortland St., New York, and 485 Summer St., Boston, make a specialty of installing heating and ventilating plants, and in a circular just received they offer to submit prices for such work as may be re-

quired on this line, and guarantee the equipment to meet with the approval of both the insurance underwriter and the owner of the property.

Pulley Covering Applied with a Brush.

The Warren Manufacturing Co., 65 South Canal St., Chicago, Ill., manufacture a pulley covering of this description, which has been in use under severe conditions for several years. The object sought is a wood or iron pulley surface which has natural affinity for the belt. This is effected by painting the face of the pulley with this cover.

The Warren Manufacturing Co., gives the best possible evidence of their faith in its merits, by offering to send it on trial with the understanding that no charge will be made for the portion used if it should prove unsatisfactory.

A pulley cover, which is so easily applied as this one and as durable as its users claim it to be, must be a valuable supply in every factory.

Various expedients are resorted to to prevent the slipping of belts; but no conditions are so satisfactory as those, when the belt is running loosely on the pulley, carrying the load easily with no slip, and consequently no occasion for preventing slipping. The loss of power due to tight belts is avoided, and the life of the belt greatly lengthened.

The Warren Mfg. Co. claim that by the use of their pulley covering these conditions are brought about.

Their pulley covering gives to the pulley face a surface which allows the belt to get all the pull it ought to have, and beyond which there is a strain. This is accomplished without sticky or injurious applications to the belt.

We note that among their old customers are many large textile mills who are cautious about adopting such expedients, unless their merit has been proved by trial.

Among their endorsers of this pulley cover we find the Clark Mile End Spool Co., American Linen Mills, Slater Cotton Co. and the R. & H. Simon Silk Mills.

Appraise Your Property Before it Burns.

The professional appraising of property in anticipation of a fire loss is a business not generally known as established, although a strong company has been engaged in the business for some time. The American Appraisal Co., 804 Park Row Bldg., New York and 503 Matthews Bldg., Milwaukee, Wis., make a business of the systematic appraisal of factory property on lines approved by insurance companies.

The value of a careful and accurate record of value invested in mills or warehouses, which are liable to be wiped out of existence without a moment's notice, is evident to all. At no time will this value be so thoroughly appreciated, as when the owner sees property of great value suddenly turned into a smoking pile of ashes. The adjustment of insurance at such a time is greatly simplified if reference can be made to a careful appraisal, and claims made for indemnity in accordance with known facts. Many bitter and expensive controversies over the adjustment of fire losses are the result of the lack of just this information, which the American Appraisal Company ascertain and put on record.

Among many letters from their clients they print from firms who have had fires after the appraisal was made, and speak from actual experience of the advantages of such an appraisal, resulting in the quick adjustment of their fire loss with the insurance companies, and ability to resume operations without delay. The following is one of them:

Boston, Mass., March 23, 1900.
The American Appraisal Co.,
Milwaukee, Wis.

Gentlemen:—

Some time ago we wrote you expressing our entire satisfaction with the appraisal and inventory which you made of our different mills January 1st, 1899, and stating that we believed they would be of great value to us, especially in case of fire.

We have just had a rather serious fire in our Mill B at Winchester, New Hampshire, and have had a practical demonstration of the truth of what we said then. The insurance adjusters have informed us that they have never had a claim for loss presented to them in as good shape as ours was, and we found that in making the settlement your inventory was of the greatest value. This was not only the case because it enabled us to satisfy the adjusters of the location and value of each piece of property, but, further, because it allowed us to make an adjustment entirely satisfactory to both sides without any delay. We were ready to take up the question of adjustment and were fully prepared for it within forty-eight hours after the fire occurred.

This was an advantage which we had not before appreciated, but which must be evident to every manufacturer, inasmuch as the greatest loss and inconvenience from a fire frequently arises on account of the delay in being able to resume work. The entire adjustment was made in two days and we were able at once to proceed to repair damages.

We were mildly enthusiastic over your work before, but are vastly more so now.

Very truly yours,
The New England Box Co.,
H. Holton Wood, President.

Branson Canadian Agency.

We are informed by the Branson Machine Co., 506 North American St., Philadelphia, that Richard Schofield, a mechanical expert, of Canada, who visited Philadelphia during the time the Export Exposition was in progress, for the purpose of examining into the merits of the various American knitting machines with a view to selecting the best machine to handle as agent in Canada, after carefully investigating the various knitting machinery, decided on the machinery made by the Branson Machine Co., and is enthusiastically advocating the product of the Branson Co., which he believes to be the most satisfactory, simple and durable of all the machines he examined. He has perfected arrangements with the Branson Co., whereby he represents them in Canada as their agent. The choice of a mechanical expert like Richard Schofield is a gratifying endorsement of the merits of the Branson machine in design, simplicity and good workmanship.

Lythite Cold Water Paint.

The necessity of frequently painting large surfaces in mills and workshops makes it a necessity to have a substitute for the oil paints. The latter are expensive and soon turn yellow. The Lythite cold water paint, sold by the Frank S. De Ronde Company, 54 John St., New York, meets all the requirements for a paint for use for inside or outside use in manufactories.

Their white paint is pure and lustrous, and causes a material increase of light in the rooms where it is used. It gives a firm, hard and uniform finish, and retains the purity of its color for a long time. This paint will be appreciated by manufacturers, who rely so much upon white walls to keep their workshops light, and are compelled to repaint the walls frequently on account of the paint becoming dull and absorbing the light, instead of reflecting it. It adheres firmly to the surface, and does not flake or rub off like the ordinary whitewash, and is not affected by weather or gases. The asbestos used in it enables it to resist fire, and it is impervious to water. The De Ronde Company guarantee to substantiate their claims in regard to it.

It contains no injurious ingredients, and is, therefore, a sanitary paint. It is easily applied, and the saving in labor is considerable. It can be used as a final or priming coat, with oil paints. It is claimed for this paint, that one coat is equal to two of oil paint, as the cold water paint does not sink into the woodwork as oils do, but adheres firmly to the surface. It is sold in the form of a dry powder, which readily dissolves in cold water, and it is stated that it supplies the place of oil paint at one-half the cost.

In addition to white, it is made in 24 handsome shades, of which sample cards will be sent on application. Messrs. De Ronde Company manufacture the National Wall Coating, for cheaper work. This comes in white and twelve colors. It is claimed for the wall coating, that while it possesses the hygienic qualities of lime whitewash, it will not absorb moisture or disease germs. It does not rub off or scale, and additional coats can be applied without rubbing up the first coat. They also manufacture Lustrogen and Aluminum paint, Lustrogen Gold paint and Holdfast, a belt dressing which has been in use for some time, and given good satisfaction.

The Taunton-New Bedford Copper Co.

This company has been formed by the combination of the Revere Copper Co., of Boston and Canton, Mass., the Taunton Copper Co., of Taunton, Mass., and the New Bedford Copper Co., of New Bedford, Mass. These three companies have followed practically the same lines of business in the past, and it is expected that this consolidation will result in many changes and improvements beneficial alike to their customers and themselves.

As the New Bedford plant is specially equipped for the manufacture of print rolls and singe plates, that branch of the business will be carried on there. Many alterations and improvements are now being made, and it is the intention to make this plant the largest and best in the world for the production of these two articles, and they will be able to give the trade the best service and maintain the quality and finish of their goods at the highest standard.

The officers of the new company are: Henry M. Lovering, president; Clarence A. Cook, vice-president and agent; and H. F. Bassett, treasurer; John H. Barrows, assistant treasurer. The office of the treasurer will be located in Taunton, and the agent may be addressed at New Bedford.

Electric Lighting for Mills.

During the last few years the enclosed type of arc lamp has been used to a much greater extent in lighting mills and factories. This type of lamp has a small inner globe surrounding the carbons, which prevents ready access of air and increases the life of the carbons from 10 to 12 hours in the ordinary "open" street arc lamp, and to 100 or 150 hours in the enclosed type. This effects a great economy in labor and renewals, besides keeping the arc steady.

We have become familiar with the advantages of ribbed window glass in factories, by reason of the diffusion of sunlight. This same result is effected in the enclosed type of arc lamp by means of an inner globe, which diffuses the light throughout the room. It also enables the carbons to be separated further, thus utilizing more light without causing an objectionable glare or dazzle. The manufacturers of the enclosed lamp claim that it is much more efficient than the incandescent method of electric lighting, that the cost for wiring is much less, as fewer lamps need be installed, and the cost for carbons and lamp renewals is much reduced.

Where plants are overloaded or not of sufficient capacity to properly light the building, enclosed arc lamps can often be installed with marked improvement.

The Lea Electric Mfg. Co., of Elwood, Indiana, builds enclosed arc lamps for which they report a steady demand from cotton and other mills. Their catalogue gives considerable information of interest, and describes in detail their lamp. They will send it upon receipt of a postal card.

Persons Seeking Homes.

Persons seeking homes or investments, or firms and corporations seeking locations in the South and who desire information about Tennessee would do well to address Robert Gates, special industrial and immigration agent, Louisville & Nashville R. R. for Tennessee, at Nashville, Tenn.

Firth & Foster Co.

Firth & Foster Co., York, Emerald and Adams Sts., Philadelphia, Pa., are adding several new fullers to the large number already in use, and which have been running day and night for months. Their hydraulic presses are being moved to more commodious quarters, which, when completed, will prove an ideal press room for Italians and serges. Their old pressroom will be converted into a dyehouse for fast colors, for which there is a growing demand, and which gave this firm quite a reputation in the market.

John J. McKay.

The entire building shown in this illustration is occupied by Mr. John J. McKay, 132 and 134 E. Allen St., Philadelphia, Pa., dealer in cotton and woolen waste.

The ground floor is used for weighing, baling and shipping purposes, while the second is occupied by the sorters, a number of hands being employed in that work. The third and fourth floors are filled with stock ready for shipping.

Mr. McKay has been in the waste business since 1873, and is probably one of the best known men in Philadelphia in his line of business, and any orders sent him will be given most careful attention. Samples of waste stock and prices from mills are requested. Correspondence solicited.

—The Walrus Fibre Mfg. Co., Boston Ave., Medford, Mass., have lately largely increased their production of fibre roving cans, mill boxes, trucks, etc., by the addition of new and improved machinery. They are now in position to handle contracts, large and small, with the greatest possible dispatch.

The rapid growth of this concern is but added evidence of the fact that they, by the excellence of their production, are rapidly gaining a foremost place as manufacturers in this line.

—W. S. Hutton, in his "Steam Boiler Construction," states that "the economy, that may be obtained by combustion with forced draft in a steam boiler, is due to the increased rate of combustion and increased efficiency of the heating surfaces produced by it, resulting in increased boiler power. The increase of power obtained depends principally upon the quantity of air brought into intimate contact with the fuel in a given time, but the power of the boiler may generally be increased from 40 to 100 per cent. by the application of well arranged forced draft."

Norristown Covering Co.

This company has been compelled, owing to the large orders received for their goods, to increase the capacity of their works. A new boiler and engine have been added, also two new dry rooms.

Preservation of Steam Boilers.

The desirability of preventing scale in steam boilers requires no demonstration. It is self-evident that after a manufacturer has invested his money in fuel for the purpose of making steam, he should prevent any unnecessary obstruction between the heat and the water. Scale is a nonconductor of heat, and its presence in a boiler causes the heat, which costs money, to go up the chimney, instead of going into the water and forming steam. Besides this, the presence of scale is a source of danger. If the boiler metal is in direct contact with the water on one side, the fire on the other can cause no injury to it, but if there is a thick coating of scale between the water and the metal, the fire may burn out the tubes and the shell.

After scale is formed in the boiler, of course, the proper method of procedure is to remove it by using a compound which will not injure the boiler; but the best way is to prevent the formation of this scale, and this can be done by introducing frequently into the boiler small amounts of such a compound, which will be constantly in solution in sufficient quantity to prevent the formation of scale.

Messrs. Straus & Co., 55 Broad St., New York, manufacture a boiler compound well known under the name of Boilerine, which has been in use for thirty years. This record is a sufficient guarantee of its merit, and that it will keep steam boilers free from scale without injury to them.

MILL NEWS.

Cotton.

New Mills.

—*Alabama, Anniston. Proposals will soon be received by the Adelaide Mills for erection of buildings, etc. The main building will be 256 by 75 feet, with boiler and engine room, 72 by 36 feet. The machinery for the mill, which we reported in a previous issue, has been contracted for.

—*Alabama, Anniston. Work will be started immediately on erection of the Woodstock Yarn Mill. The main building will be 100 by 340 feet.

—*Alabama, Enterprise. All of the necessary stock for the new $100,000 cotton mill, to be built by the Coffee Cotton Mill Company, has been subscribed. The contract for the machinery has been let to the Lowell Machine Shop, who will furnish plans for the buildings.

—Alabama, Huntsville. A new cotton mill, capitalized at $1,000,000, will be established at this place with an equipment of about 50,000 spindles. Col. T. W. Pratt, of the West Huntsville Cotton Mill is also interested.

—*Alabama, Jacksonville. Plans have been completed for the erection of a $150,000 cotton mill, for manufacturing cotton yarns. It is thought that a bleachery may also be added. George P. Ide of Jacksonville is interested.

—*Alabama, Opelika. Work has been started on construction of the Opelika Cotton Mill buildings. They will make 30s to 60s warp yarn and will install 6500 spindles in the plant at first, eventually increasing to 15,000. J. R. Hardaway is general manager.

—*Alabama, Uniontown. The Ellawhite Cotton Mills, recently organized at this place, will have an equipment of 3500 spindles.

—Arkansas, Helena. The Premier Cotton Mills have been incorporated with capital of $100,000, of which $60,000 has already been subscribed. E. C. Horner is president; G. F. Harrington, vice-president; F. H. Merrifield, secretary and R. C. Burke, treasurer.

—*Canada, Hamilton. J. M. Young is president, W. D. Long, vice-president and C. T. Grantham, manager and secretary of the Imperial Company, recently incorporated for purpose of manufacturing duck. Work will be started immediately on construction of plant, which they expect to have in operation by next fall.

—Connecticut, Stratford. Negotiations are now being carried on by E. C. Wood of this place, and the Manhattan Web Co., of New York City, relative to purchasing land upon which they will erect a 3 story building, 350x100 feet.

—Georgia, Albany. Mayor S. B. Brown and H. M. McIntosh are interested in the project of a new cotton mill at this place. Subscriptions toward the enterprise are now being solicited.

—Georgia, Barnesville. Mayor John L. Kennedy, J. C. Collier, J. J. Rogers and J. W. Hanson are interested in the establishment of a $250,000 cotton mill at this place, in which a Northern capitalist is also concerned.

—*Georgia, Carrollton. Operations will be started in the new Mandeville Cotton Mill about July 1st.

—*Georgia, Columbus. E. P. Dismukes is president, E. N. Clemence, vice-president, Harry Loeb, secretary and treasurer and Geo. M. Miller, superintendent of the Columbus Wadding Mill Co., recently organized.

—*Georgia, Columbus. About $40,000 worth of stock has already been subscribed toward the $100,000 cotton mill proposed at this place, in which Walter Weaver is interested. D. E. Tompkins, of Charlotte, N. C., has offered to take $10.000 worth of stock.

—*Georgia, Columbus. The capital stock of the Columbus Mfg. Co. has been increased from $225,000 to $400,000. It is expected to have the new mill, with capacity of 20,000 spindles, in operation in August.

—*Georgia, Covington. A company has been recently organized here for the erection of a $100,000 cotton mill. T. C. Swann is president; C. S. Porter, vice-president and general manager, and W. C. Clark, treasurer.

—*Georgia, Dublin. The Dublin Cotton Mills, incorporated with capital of $100,000, Wm. Pritchett, president; J. M. Fries, treasurer, and J. Wheeler Mears, superintendent, will equip the plant with 5000 spindles. They have not fully decided as to what grade of goods will be made.

—*Georgia, Eastman. The Eastman Cotton Mills have been organized with a capital of $100,000 and will erect a factory for manufacturing sheetings, shirtings and yarns. The mill will have an equipment of 5000 spindles and 160 looms. Mr. M. H. Edwards is interested in the above project. They are now receiving estimates on all the necessary machinery. Company will be permanently organized May 31st.

—Georgia, East Point. The Gate City Mfg. Co. has been organized and charter secured. The plant will be equipped with 5000 spindles for spinning hosiery yarn and later will add 5000 more and knitting machinery for using the yarn. The machinery and power plant has been contracted for, but proposals are now being received for other equipment. The present offices are in Atlanta.

—*Georgia, Eatonton. Plans and specifications are now being prepared by C. R. Makepeace of Providence, R. I., for the new mill to be erected by the Middle Georgia Cotton Mills, capitalized at $100,000. The main building will be 70 by 200 feet, with an engine room, 40 by 50 feet. Details of the new plant previously mentioned.

—*Georgia, Elberton. We have been informed by W. C. Jones, who is interested in the new mill proposed at this place, that they have not yet decided what kind of a mill will be erected. Subscriptions are now being taken for the new enterprise which they think will be for manufacture of both yarns and cloth, with about $200,000.

—*Georgia, Gainesville. The Woodside Cotton Mill Co. has been organized and chartered with capital of $200,000, with J. D. Woodside, as president. Work will be started during May on construction of buildings which will be equipped with 10,000 spindles and 350 looms.

—*Georgia, Lagrange. A temporary organization has been formed for the Unity Cotton Mills, with Dr. T. S. Bradfield, temporary chairman, N. R. Hutchinson, secretary, and Col. Joseph E. Dun, treasurer. They have so far secured over $100,000 toward the proposed $200,000 capital stock.

—*Georgia, Louisville. About $55,000 has been subscribed toward the new cotton mill for this place. A committee has been chosen to secure a site and purchase machinery. W. W. Abbott is president; J. C. Little and R. L. Gamble, vice-presidents; W. P. Lowry, secretary and treasurer and W. S. Witham, financial agent. Other data previously reported.

—Georgia, Macon. The Exchange Cotton Mfg. Co. has been organized with a capital stock of $25,000, privilege of increasing to $250,000, by J. W. Cabanis and others. Arrangements are now being made for the erection and equipment of the plant.

—*Georgia, Monroe. The new Walton Cotton Mills Company recently incorporated with capital of $75,000, C. T. Mobley, president; Edgar S. Tichenor, secretary and treasurer, will be in operation about December. As previously reported the plant will be started with 3,300 spindles and 100 looms for making standard sheetings, drills and duck. They will build to accommodate 5,000 spindles with sufficient power for 10,000 ultimately.

—*Georgia, Moultrie. Work will now be started on erection of the Moultrie Cotton Mills, which will manufacture 4-yard sheetings. The plant will be equipped with 5000 spindles and 160 looms. Other data has been previously mentioned.

—*Georgia, Tifton. Work will be started at an early date on the construction of the Tifton Cotton Mills buildings.

—*Georgia, Warrenton. The B. L. Battle Manufacturing Company has been organized for purpose of erecting a yarn and knitting mill. J. F. Allen has been elected president. Over $20,000 has already been subscribed toward the enterprise. It is proposed to increase the share takings to $40,000, which will give sufficient capital to erect such a plant as projected.

—Kentucky, Monticello. W. M. Anderson is interested in a project now afoot for the establishment of a cotton mill here. Subscriptions are now being received.

—*Louisiana, Hammond. At a meeting of the stockholders of the Hammond Cotton Mills Co., recently, it was voted to start work on buildings, etc., for a spinning mill, when $15,000 had been subscribed, instead of $25,000 as previously reported. Work will be started on construction shortly.

—*Massachusetts, Fall River. Hon. W. S. Greene is president, James Whitehead vice-president, A. F. Phillips, treasurer, and James Tansey, clerk of the American Cotton Mfg. Co., recently organized to build a cotton mill here. This is the project in which the labor unions are interested, and the secretaries of the unions will be directors. The capital has yet to be raised.

—*Massachusetts, Springfield. Further information regarding the Meyer Thread Company, capitalized at $500,000, reported last week at this place, is that the company succeeds the Whitcomb Winding Co., formerly at Holyoke. John C. Meyer of John C. Meyer & Co., the selling agents, is president and treasurer, and Chas. H. Cressy, superintendent. They will prepare spool cotton for the market and ready wound bobbins for all sewing machines. A dye house is attached to the plant.

—*Mississippi, Enterprise. The Enterprise Cotton Mill Co., capitalized at $100,000, will build and operate a cotton mill at this place. This project was mentioned some time ago.

—*Mississippi, Kosciusko. At a recent meeting of the stockholders of the Kosciusko Mills, the capital stock was increased from $125,000 to $150,000. Work is now progressing on the buildings, which they hope to have in operation the latter part of the year.

—*Mississippi, McComb City. The contract for the erection of the McComb City Cotton Mills has been let to W. J. McGee, who is to have them completed ready for installation of machinery by Sept. 30th.

—*Mississippi, Winona. It is proposed to have the Winona Cotton Mill completed in the late fall of 1900. The plant will have an equipment of 5000 spindles and 170 looms, for manufacturing coarse sheetings and drills.

—*New Hampshire, Manchester. Work is progressing rapidly on the erection of the new buildings for the Manchester Mills. One will be 770 by 100 feet, 4 stories high, to be used a a printing department; another for engraving, 160 by 60 feet and one 200 by 100 feet, with wing, 100 by 50, for finishing. As soon as the buildings are completed, the machinery and business formerly operated from the north side of Granite Street, will be removed.

—*North Carolina, China Grove. The Linn Mills Co. has been incorporated with capital of $50,000, privilege of increasing to $200,000. D. B. Coltrane is president; C. W. Corriher, secretary and treasurer. C. J. Deal, whom we previously reported as interested, is among the directors. A site has been secured and work will be started at once on erection of buildings.

—*North Carolina, Greenville. At a meeting held recently in the interest of a new cotton mill here, a company was organized with J. G. Moye, president; R. L.

Davis, vice-president and S. T. Hooker, secretary and treasurer. They have already secured $50,000 toward the project.

—North Carolina, Greenville. J. A. Speight & Co. are interested in the project of establishing a 10,000-spindle yarn mill at this place. It is stated that over half the necessary capital has been subscribed and that construction of buildings will start at an early date if the plans are successfully carried out.

—*North Carolina, Lexington. Work has been started on the erection of the Nokomis Cotton Mills buildings. It is expected to have them completed about November 1st.

—*North Carolina, Spray. The Lily Mills, with capital of $30,000; B. Frank Mebane, president; J. S. McAlister, treasurer and W. E. Farrington, superintendent, will manufacture colored cotton cloths, commencing production about July 1st. The plant will have a total of 382 looms.

—*Pennsylvania, Carbondale. The Empire Silk Company is the name of the firm which will be removed to this place and for which this place has been making efforts to secure. A new mill is to be erected and as soon as completed the removal will take place

—*Pennsylvania, North Wales. Operations have begun in the new yarn plant recently erected by the Fibre Spinning Company.

—*Rhode Island, Warren. Work has been started in the plant of the Narragansett Yarn Mill, recently established at this place.

—*Rhode Island, Warren. Nearly all of the looms are running in the new Parker Mill, which will give employment to about 400 people when in full operation.

—*South Carolina, Barnwell. Frank H. Creech, C. F. Calhoun, A. Howard Patterson and W. H. Duncan, are interested in the new company recently organized with capital of $100,000 to erect a cotton mill. The capital stock is to be paid in in four equal installments, so that $25,000 will become available to start with and the balance as required for the construction and equipment.

—*South Carolina, Camden. E. M. Boykin has been elected president and treasurer of the De Kalb Cotton Mills and T. C. Duncan, vice-president. Data concerning the plant has been previously reported.

—*South Carolina, Cross Anchor. Dan. Yarbrough informs us that they have not yet completed organization of new company to operate a cotton mill at this place, but that they expect to soon. No decision has yet been made as to what they will manufacture. A small mill will be erected first and later additions will be made. They have a power of 1500 h. p. with 28 ft. fall, but are about 3 miles from a railroad.

—South Carolina, Eastover. T. H. Auld, Allen Jones and Francis H. Weston are interested in a company which proposes erecting a cotton factory here. Over $50,000 has been subscribed toward the project.

—*South Carolina, Ninety-Six. E. M. Lipscomb, who with J. P. Phillips and others is interested in a mill at this place, informs us that the plant will be known as The Cambridge Mills, and that plain cotton goods will be manufactured.

—*South Carolina, Pickens. Frank Hammond (Greenville), is president and treasurer of the Pickens Cotton Mills, recently organized with capital of $250,000; W. T. McFall, vice-president and P. E. Alexander, secretary.

—South Carolina, Seneca. The Oconee Manufacturing Co. has been incorporated with a capital stock of $100,000 for purpose of developing water power, transmitting power electrically, manufacturing cotton goods, etc. F. M. Cary, M. W. Coleman and J. W. Harper are among those interested.

—South Carolina, Whitmires. Dr. R. R. Jeter, of Whitmires, Ann Rice of Union and Wm. Coleman, Charlotte, are interested in the erection of a large cotton mill at this place.

—*South Carolina, Woodruff. At a meeting held recently by the stockholders of the Woodruff Cotton Mill, Augustus W. Smith was elected president and treasurer and J. B. Kilgore, secretary. They will purchase a site and start work on erection of the plant, for which over $200,000 has been subscribed.

—*Tennessee, Chattanooga. A. S. Hamilton, of Trion Factory, who is also interested in the new cotton mill proposed at this place, has completed all the financial arrangements for the mill of 25,000 spindles and 750 looms.

—*Tennessee, Jackson. The Jackson Fibre Company, which has been incorporated with a capital stock of $400,000, will own and operate the 20,000 spindle mill established here by the Bemis Bros. Bag Co.

—*Tennessee, Knoxville. The Knoxville Cotton Mills, of which L. D. Tyson, is general manager, will be equipped with 10,000 spindles and complement.

—*Tennessee, Memphis. The old Pioneer Cotton Mill, recently acquired by J. A. Pinchback and J. A. Smith, will be operated under the name of The Memphis Cotton Spinning Co., for manufacturing 2 ply 20s yarn, with equipment of 14,000 spindles. Later on cloth will be made.

—*Texas, Bonham. The directors of the Bonham Cotton Mills, recently incorporated, have purchased a site and will start work at once on construction of buildings. The contract for the machinery has been placed with the Lowell Machine Shop, of which John Hill, of Atlanta, Ga., is the southern representative.

—*Texas, Denison. Work has been started in the picking room of the Denison Cotton Mill. It is expected to have the other departments in operation soon.

—*Texas, Fort Worth. A recent report states that A. N. Evans, who is now in-

terested in the proposed cotton mill here, has $50,000 subscribed toward the $100,000 required for the enterprise.

—*Texas, Gonzales. The Gonzales Cotton Mills have been incorporated with a capital stock of $125,000. J. P. Randle, president and C. T. Rather, treasurer. The plant will be equipped with 5000 new spindles and 100 looms for making white and coarse brown goods. Work will be started about July or August on construction of buildings. The stock is over subscribed. This looks like a sure thing.

—*Texas, Itasca. The capital stock of the Itasca Cotton Mfg. Co. has been increased to $125,000 in order that they may install a 5000-spindle plant and at the same time make preparations for putting in 5000 additional ones at a later date with but little expense. They will probably manufacture 36-inch, 3-yard sheetings.

—Texas, Mexia. Karner and Phillips are interested in the erection of a new mill, with $100,000 capital stock, at this place. About 80 per cent. of the stock has already been subscribed.

—Virginia, Martinsville. A large seamless bag manufactory is to be established at this place. A company has been organized with capital stock of $75,000. Work will be started on construction at once.

—*Virginia, Roanoke. At a recent meeting of the stockholders of the Roanoke Cotton Mill ,capital stock $100,000, R. R. Fairfax was elected president; B. P. Travers, first vice-president; J. H. Yost, secretary; Ed. L. Stone, treasurer and F. B. McElwee, general manager.

—*Virginia, So. Boston. The company recently organized here will operate a cotton mill to be known as the Century Cotton Mills. The capital stock will be $200,000; Rev. R. T. Wilson, president, and L. A. Lukin, manager.

Enlargements and Improvements.

—*Alabama, Eufaula. The Eufaula Cotton Mills inform us that the new addition to their plant will be equipped with 15,000 spindles and 400 looms, giving the plant a total of 26,000 spindles and 750 looms, when completed.

—Alabama, Mobile. Work will be started soon on erection of an addition to the Mobile Cotton Mills, which will provide for 5,000 additional spindles, giving the plant a total of 10,000 when completed.

—*Alabama, Selma. The Estelle Mills are now installing 5000 spindles in the addition recently built.

—Connecticut, New London. New boilers are to be installed about June 1st, in the plant of the R. T. Palmer Co. They are now making repairs on the stock house.

—Georgia, Augusta. The Sibley Mill has recently completed addition of one story over their cloth room and are now installing new machinery.

—*Georgia, Griffin. The Spalding Cotton Mills, whose capital of $125,000 has been increased to $200,000, and of which W. J. Kincaid, is president: J. J. Mangham, treasurer and Allan Little, superintendent, inform us that 4000 additional spindles and 40 looms will be installed, giving the plant a total of 9000 spindles and 240 looms. The addition will be in operation Sept. 1st.

—*Georgia, Trion Factory. Nearly all of the machinery in the new mill of the Trion Manufacturing Company has been installed.

—*Georgia, Toccoa. Work is now progressing on the new addition to the Toccoa Cotton Mills. They will install 3000 additional spindles with carding machinery.

—*Massachusetts, Easthampton. The addition, 60 by 55 feet, reported in a previous issue to be built to the plant of the Nashawannuck Manufacturing Co., manufacturers of elastic fabrics, is now under construction. When completed, employment will be given to about 100 additional people.

—Massachusetts, Saundersville. Contract has been let for the erection of two large storehouses for the Saunders Cotton Manufacturing Company, and work will be started at once on building.

—Massachusetts, Warren. Work will soon be started on erection of a building, 40x60 feet, by the Thorndike Mfg. Co., near the No. 2 mill. The new addition will be used as a clothroom and shipping department and the space now occupied by these departments will be utilized for manufacturing purposes for which new machinery will be installed when new addition is completed.

—New York, Capron. An addition, 150 by 70 feet, 4 stories high, is being erected by the Utica Cotton Company. The new building will be equipped with 20,000 spindles. A new engine house, 40 by 50 feet will also be built.

—New York, Patchogue. Work will begin at once on additions and improvements to be made to the Patchouge Mfg. Co.'s plant.

—New York, Warwick. The Fabric Hose Company is to increase the producing capacity of the plant, owing to the great demand for the goods.

—North Carolina, Concord. The Odell Manufacturing Co. is now installing some new machinery in the plant for making goods resembling elderdown, which will be used for lap robes, bath robes, etc.

—North Carolina, Concord. An addition, costing about $100,000, is to be built by the Cabarrus Cotton Mill. They have already purchased the site.

—*North Carolina, Jamestown. The Oakdale Cotton Mills inform us that they will install 1000 additional spindles in the plant, and also dye house for skein yarns.

—*North Carolina, Kinston. The directors of the Kinston Cotton Mills will issue $80,000 worth of bonds, for purpose of doubling the capacity of the plant.

—Pennsylvania, Philadelphia. The plant formerly operated by Rumpf Bros. and Witty, will now be controlled by Frederick and William Rumpf, who

will increase the plant at Attleboro, by erecting an addition, 40 by 160 feet, to be used as a dye house and machine shop.

—Pennsylvania, Philadelphia. Weimar Bros., 1817 East York St., expect to move on June 1st to a new plant at 2046 Amber St., where they will increase their equipment to 32 looms. They use electric power. It is only a few years since this firm started in business with a small number of looms, and their growth has been very rapid.

—Pennsylvania, Philadelphia. Herbert B. Newton, 139-141 Oxford St., manufacturer of tapestry goods, has recently installed 7 additional looms in his plant, giving a total of 20 now running full.

—Pennsylvania, Wilkesbarre. It is reported that the Unicn Lace Mill Co. contemplates erecting a large addition to the plant and installing about 20 more machines.

—*South Carolina, Ashby. The capacity of the Ashby Cotton Mill is to be enlarged. The citizens have subscribed $30,000 worth of stock for the purpose.

—*South Carolina, Batesburg. An addition is now being made to the Middleburg Cotton Mill, now equipped with 2600 new spindles and 170 looms, which, when completed, will give them a total of 5300 spindles and 350 looms. This is the concern which purchased the Batesburg Cotton Mill. All of the old machinery has been taken out and the new installed. H. J. Farber Drewry & Co., New York, are the selling agents. The spinning department is run night and day.

—South Carolina, Greenwood. The capital stock of the Greenwood Cotton Mills has been increased from $180,000 to $400,000.

—*South Carolina, Graniteville. The Graniteville Mfg. Co. will start work June 1st on foundations for a new addition, to be equipped with 15,000 spindles and 500 looms, giving the plant a total, when completed, of 49,900 spindles and 1606 looms. The annex will be in operation about March, 1901.

—*South Carolina, Marion. The capital stock of the Ashby Cotton Mills is to be increased $30,000 for the purpose of enlarging the capacity of the plant.

—South Carolina, Piedmont. At a recent meeting of the stockholders of the Piedmont Manufacturing Company, it was decided to install 5000 additional spindles in the plant.

—South Carolina, Yorkville. Contracts have been let by the York Cotton Mills for an addition to be built to their main mill and a number of new cottages.

—Tennessee, Knoxville. An addition, 64 by 75 feet, is to be built to the Brookside Cotton Mills. New machinery will be installed when completed.

—Texas, Galveston. The stockholders of the Galveston Cotton Mills are now considering the project of increasing the number of spindles in the plant to 30,000.

—*Virginia, Petersburg. Additional enlargements and improvements are to be made during the summer to the Pocahontas Cotton Mills.

Mills Starting Up.

—*Georgia, Quitman. The new Atlantic & Gulf Mills have started operations in full.

—*South Carolina, Chester. The Springstein Mills, which have been shut down while changes were being made at the mill, have resumed operations.

Woolen.

New Mills.

—*California, Eureka. Contract for the erection of the Eureka Woolen Mills has been let to W. J. Little, who will start wort at once on building.

—Maine, Skowhegan. A recent report states that L. W. Weston will erect a building, 120x43 feet, for a company which will manufacture worsted goods.

—Massachusetts, Plymouth. George Mabbett & Son have purchased the new shoe factory here and will equip it for the manufacture of woolens.

—Massachusetts, Watertown. The Falcon Worsted Company is a new concern, managed by Frederick O. and Edwin S. Inman, formerly with the Aetna Mills, at this place. They have leased 20 looms and are manufacturing cloth.

—Minnesota, Gordonsville. A new rag carpet factory is to be established at this place by J. Funmore & Co. The machinery is now being installed.

—*Ohio, Cleveland. The new mill, reported last fall to be erected by Beckman & Co., has been completed, and work will soon start on installation of the new machinery.

—Pennsylvania, Philadelphia. Matlack, Danby & Fetterolf, is a new concern recently formed and which has purchased McCallum & McCallum's carpet mills, known as the New Glen Echo Mills, at Wayne Junction. They will continue making Brussels and Wilton carpets. Messrs. McCallum & McCallum will devote all their time to the retail business, which they have in connection with the carpet weaving plant.

—*Pennsylvania, Philadelphia. Plans have been prepared for a new building to be built by the Angora Mfg. Company, replacing plant recently destroyed by fire, and bids will soon be asked for.

—Pennsylvania, Philadelphia. Tournier & Lauber, a new concern for manufacturing upholstery goods, have recently leased space in Wm. Judge & Bro's mill at Front St. and Columbia Ave. and are installing 20 modern upholstery looms.

—*Rhode Island, Bristol. The plant of the American Manufacturing Company, of which John R. Milson, is president and general manager, Arthur O'Leary, treasurer and C. J. Diedrich, secretary, will start operations about June 1st. The company has a secret process of carbonizing wool and will manufacture fancy portierres and other curtains.

—*Virginia, Front Royal. The Royal Tapestry Co., which has been organized at this place with capital of $30,000, with Irving A. Buck, president; Geo. P. Rich-

ards, treasurer and Jos. C. Davis, superintendent, will manufacture covers, curtains and upholstery piece goods. The plant will have an equipment of about 40 looms. Operations will be started about July 1st.

Enlargements and Improvements.

—Alabama, Anniston. The Anniston Carpet Mills are now installing six additional looms in the plant, giving them a total of thirty-six.

—Connecticut, New London. New finishing machinery will be installed in the New London Woolen Mill.

—*Indiana, Mishawaka. The Mishawaka Woolen Mfg. Co., which has frequently been making improvements to the plant, will now construct a new power plant.

—Maine, Abbott Village. It is reported that the Dill Mfg. Co. contemplates increasing the plant to five sets if the woolen business continues as prosperous as it has been.

—*Maine, Dexter. It is expected that the new addition now being erected at the Morrison Woolen Mill, will be completed about June 20th.

—*Maine, Hartland. Plans are now being made by the Linn Woolen Company for an addition to be built to the plant, which will greatly increase the capacity and give more room for additional machinery.

—*Maine, Madison. The new addition to the Indian Spring Woolen Mill, replacing that of the plant destroyed by fire recently, will be 66 by 110 feet. Contract for the erection of same has been let to J. H. Russell.

—*Maine, Oldtown. Twelve new looms are to be installed in the Ounegan Mills, giving employment to 20 additional people.

—Maine, Sanford. The Sanford Mills are having an addition built to Mill B, 256 by 24 feet, one story, with basement, in which they will install additional looms.

—Massachusetts, Byfield. The Byfield Woolen Company, manufacturers of blankets and felts, is to build a large addition, which will double the capacity of the present plant.

—Massachusetts, Plymouth. Electric lights are to be installed in the Standish Worsted Company's mill. The looms in the weave shed are also to be operated by motors run from the dynamo now there.

—*New Hampshire, Keene. The Faulkner & Colony Manufacturing Co. inform us that they will install 3 new sets of cards and from 12 to 16 new looms in the new addition, which they will start building shortly.

—New York, Fulton. The American Woolen Co. will build a new dye house at their plant at this place.

—*New York, Warrensburg. Work has been started on the erection of an addition, 35 by 52 feet, to the Warrensburg Woolen Mill. It is said that a new industry, furnishing employment for about 50 people, will be started, when completed.

—Pennsylvania, Norristown. Ivans, Dietz & Metzger, proprietors of the Norristown Carpet Mills, with main mill at Philadelphia, contemplate erecting a large stock building and making other alterations and improvements to the plant. P. M. Weber has the matter in charge.

—Pennsylvania, Philadelphia. A four-story brick addition is to be built to the Star Woolen Mills, Krams Ave., Manayunk, of which James Stafford's Sons are the proprietors. Wm. H. Endlemen is now receiving estimates on construction.

—Rhode Island, Carolina. The Carolina Mills Co. are installing three new mules in the spinning department and also an eleven roll condenser in the carding room. They will erect a large water tank with capacity of 10,000 gallons, to provide against fire. A new roof will be put on the dye house.

—Texas, Waco. An addition, 56 by 18½ feet, is being built to the dye house of the Slayden-Kirksey Woolen Mills.

—Wisconsin, Menasha. A large new boiler is being installed in the Menasha Woolen Mills. W. P. Hewitt & Co., proprietors. The mills have been closed during the change.

Mills Starting Up.

—*Canada, Oshawa. The plant of the Schofield Woolen Company, recently damaged by fire, has been repaired and operations resumed.

—*Connecticut, Danielson. The Chase Woolen Co.'s Mills, at this place and East Killingly, have resumed operations after several months' idleness.

—Minnesota, Rochester. The Rochester Woolen Mills, which have been standing idle for some time, will start up June 1st, under the management of H. K. Terry. They will manufacture cassimeres, which will be cut up in a new pants' factory, which will be built at once, and for which a site will soon be selected. A new company has been formed.

—*Oregon, Pendleton. The Pendleton Woolen Mills are to be put in operation as soon as competent help arrives.

Mills Shutting Down.

—New York, Skaneateles Falls. The Ayrshire Woolen Mills, Gavin Morton, proprietor, have been shut down, owing to lack of orders.

Knit.

New Mills.

—*Connecticut, New Haven. The Whiteknit Mills, recently destroyed by fire, are being rebuilt, at 116 Gregory Street. Men's seamless half hose, 36 gauge, will be made. About 16 new knitting machines will be added, giving the plant a total of 25. Production of goods will commence about June 15th.

—*Georgia, Americus. A recent report states that a knitting mill for making hosiery and underwear is to be establish-

ed at this place by Rhode Island and local capitalists. Plans for the buildings and cost of machinery have all been agreed upon.

—*Georgia, Cordele. The company to operate the new knitting mill for making underwear has not yet been organized, although they have subscribed the capital stock of $25,000, and appointed men to hold the offices as follows: J. A. Lasseter, president; J. G. Jones, treasurer; O. P. McKinney, agent and J. A. Littlejohn, superintendent. Work will be started about July 1st. on construction of the building. Equipment has not yet been decided upon. Steam will be the motive power.

—*Georgia, Eastman. M. H. Edwards is interested in the new knitting mill to be erected at this place. They have not yet decided whether they will manufacture hosiery or ladies' underwear. The plant will be equipped with about 20 knitting machines. Estimates are now being taken on all the necessary knitting machinery.

—Georgia, Elberton. A $30,000 knitting mill is projected at this place.

—*New York, Amsterdam. A recent report states that the Liddle Knitting Company, recently incorporated, has purchased the Spartan Mills, until recently operated by Hon. John K. Stewart, who purchased them some time ago. The plant is equipped with 4 sets for the manufacture of the lower grades of cotton or wool underwear.

—*New York, Johnstown. The Diana Knitting Co., recently incorporated with capital of $50,000, George Veghte, president and treasurer and Geo. A. Vosburgh, agent and superintendent, will manufacture men's, women's and children's ribbed underwear, operating 75 machines. They expect to begin production of goods about Nov. 1st. This is the plant formerly reported at Fort Plain. All communications are now being received at Fort Plain.

—*New York, Newport. Bids are now being received for the erection of the knitting factory at this place, in which Titus Sheard of Little Falls is interested. The buildings to be completed by Oct. 1st.

—*North Carolina, Raleigh. The Melrose Knitting Mills, capitalized at $25,000, now under construction, expect to begin operations about Sept. 1st, making men's underwear.

—North Carolina, Scotland Neck. Messrs. Andrews and Coughenour and J. E. Bowers will erect another knitting mill here for making hosiery. The building will be 40 by 90 feet, and will give employment to about 100 colored operatives. J. E. Bowers will be manager of the plant.

—*Pennsylvania, Boyertown. The knitting mill, recently vacated by Geo. W. Unger, who has moved to new quarters, will be put in operation by Dr. L. K. Francis and son.

—*Pennsylvania Millheim. The Harrison Hosiery Company has been organized to operate the new knitting mill established here. C. P. Hancock is president; F. C. Angle, secretary; Alfred Walter, treasurer and W. Joseph Harrison, superintendent. They now furnish employment for about 50 people, the number to be increased.

—Pennsylvania, Philadelphia. The Economy Knitting Co. has recently been organized and is now operating a mill, making ladies' cotton hosiery at Oxford and Turner Sts. Wm. Rowbottom, J. C. Bower and others are interested.

—Pennsylvania, Philadelphia. George Long, formerly with Charles Webber and Thomas W. Bowers, with John Blood & Bros., have formed a partnership and are now operating a plant making misses' seamless and men's half hose, under the name of Long & Bowers.

—Pennsylvania, Philadelphia. The May Knitting Company is a new concern recently formed for manufacturing cotton hosiery. The plant is located in Thos. Henry & Sons' Mill, formerly known as the Thomas Dolan & Co.'s plant.

—Pennsylvania, Reading. C. A. Conrad has recently started the manufacture of hosiery at this place.

—*Pennsylvania, Shoemakersville. Wagner & Heckman's knitting mill at this place will manufacture cotton seamless hosiery, operating 21 machines, with steam power.

—Pennsylvania, Troy. The Troy Knitting Company have decided to rebuild their mill, which was destroyed by fire recently. They have not yet decided upon a location, as they do not care to build on former site. The loss is estimated at about $18,000, with insurance of $12,000.

—*Pennsylvania, Troy. The Troy Knitting Co., whose plant was recently destroyed by fire, has started rebuilding the mill and will have it in operation about the 15th of August. They will install 2 sets of cards, 800 spindles and 30 knitting machines, for making fine wool ladies' hosiery and also fine worsted goods. The firm comprises L. H. Olins, Wm. F. Dewitt, J. F. Pierse, M. L. Case, H. K. Mitchell and Jos. Stead, an unlimited partnership.

—Pennsylvania, Williamsport. At a meeting held recently by the citizens in the interest of establishing a knitting mill, the meeting was organized with J. M. Furey, president, and George N. Plankerhorn, secretary.

—South Carolina, Blacksburg. The Blacksburg Spinning & Knitting Co. has been recently incorporated with capital stock of $15,000 by J. G. Black, A. H. Pollock, J. Meir and others. It is stated that they will equip the plant for knitting mill at first and later may build a yarn mill.

—*Virginia, Farmville. W. G. Venable is president; S. P. Venable, secretary, and S. P. Vanderslice, treasurer of the Farmville Knitting Mill Co., about which we have made previous reports. They are nearly ready to start.

—Virginia, Norfolk. The Norfolk Hosiery Mills Company has been organized with A. M. Bowling (Baltimore) president; F. M. Kellam (Norfolk) vice-president; B. R. Ritter (Baltimore) secretary;

William P. Bowling (Baltimore) treasurer. The capital stock is placed at $10,000 to be increased to $50,000. Yarns and cotton and woolen hosiery will be manufactured.

—*Virginia, Williamsburg. The new knitting plant at this place will be operated by the Williamsburg Knitting Mill Co., recently organized with capital stock of $50,000, L. W. Lane, Jr., president and A. W. Chapin, superintendent. The plant will be equipped with 25 knitting machines for making fleece-lined underwear and balbriggans. Cone yarn will be used for the present, but later carding and spinning machinery is to be installed. Steam will be the motive power.

Enlargements and Improvements.

—*Georgia, Rossville. Additional machinery has been installed in the Richmond Hosiery Mills, increasing the capacity from 900 to 1000 dozen pairs of hosiery per day.

—*Iowa, Des Moines. Work is now progressing on the alterations and improvements to the Tabernacle property recently purchased by the Iowa Knitting Company and which we have previously reported on.

—Missouri, St. Louis. The Criterion Hosiery Mills will now be operated under the name of the Premier Hosiery Mills, Wm. G. Hills, proprietor and Paul F. Vogel, superintendent. The capital stock has been increased to $25,000. They are now installing a fully equipped dye plant. The plant is equipped with 25 knitting machines.

—Michigan, Lansing. The property of the Lansing Clothing Company has been purchased by the Michigan Knitting Company, who will remove from their present location to the new quarters. A new dye house is to be built and it is thought that the concern will add the manufacture of clothing to the knitting business.

—New York, Fort Plain. The Devoe Mills contemplate installing additional machinery in the plant.

—New York, Greenwich. Twelve new knitting machines have recently been installed in the plant operated by Jesse V. Palmer.

—*New York, Little Falls. After a shut down, during which time repairs and improvements have been made to the Little Falls Knitting Co.'s plant, work has been resumed. A new 250 h. p. engine has been installed, also a new dynamo and a 48-inch mixing picker. They have also ordered two three-cylinder garnet machines.

—New York, Oneonta. The Gloversville Knitting Company will establish a branch factory at this place.

—New York, Rome. The Rome Textile Company is to erect a large addition to the plant.

—*New York, Warsaw. The Warsaw Knitting Mills have recently received five new German machines and are installing the same in the plant.

—Pennsylvania, Kutztown. The improvements to H. K. Deisher's Knitting Mills have been completed recently. Among the additions made, was the adding of one story, raising the engine and dynamo and new flooring.

—Pennsylvania, Lewisburg. Jos. Musser & Sons are now having an addition built to their knitting plant.

—Pennsylvania, Philadelphia. Plans have been prepared for a four-story brick addition to be built to Thos. Buck & Co.'s hosiery plant, at Front, York and Jasper Streets.

—*Virginia, Berkley. The Berkley Knitting Mills, reported as erecting an addition, will install seven new knitting machines in the plant, giving them a total of twenty.

—*Virginia, Suffolk. An addition is to be built to A. H. & W. E. Cobb's knitting mill at this place. A dyeing plant will be installed when completed.

Mills Starting Up.

—*New York, Perry. The Perry Knitting Company's new yarn mill has been completed and they are now securing the necessary help.

Mills Shutting Down.

—New York, Little Falls. The plant of the Rockton Knitting Mills has been shut down for two or three weeks, until a new water wheel is put in and other necessary repairs made.

Silk.

New Mills.

—*Maine, Westbrook. Contract for the erection of the new mill for the Haskell Silk Company has been let to Gray & Hueston, who will begin work at an early date.

—Michigan, Belding. A new silk weaving mill, 400 by 200 feet, 4 stories high, will be erected here by Belding Bros., who recently made a proposition to the city, which has been favorably acted upon, that if they would be exempted from taxation for a period of ten years, the plant would be built. This will furnish employment for about 500 people.

—*New York, College Point. The new concern now operating a ribbon mill at this place, is known as the Columbia Weaving Co., Schwarze, Stern & Erlenhoetter, proprietors, instead of Schwarze & Levy, as previously reported.

—*Pennsylvania, Bradford. Henry Leon, of Paterson, N. J., who is to operate a throwing mill here, is in the market for a second hand 100 h. p. boiler and 75 h. p. second hand engine.

—*Pennsylvania, Coplay. Work has been started on construction of the buildings for the new silk mill to be established at this place.

—*Pennsylvania, Trevorton. The Shamokin Silk Throwing Co., capital of $20,000, D. F. Reichert, president; Wm. M. Dunkleberger, treasurer; expects to have the silk throwing plant in operation by July. They have erected a building and are now installing the machinery from the Shamokin Silk Mill.

—Pennsylvania, Weissport. A new silk throwing plant has been established at this place by Messrs. Storms and Miller. They have leased space in one of James I. Blakslee's buildings and will give employment to about 50 people.

—*Pennsylvania, Whitehaven. Work has been started on the erection of the new silk mill here, which will be operated by F. Frigerio and Peter Magagna, formerly connected with the Freeland Silk Mill Co.

—*Pennsylvania, York. The new silk plant at this place, about which we have made previous mention, will be known as the Diamond Silk Co., capital of $200,000. R. L. Shetter is president and P. C. Wiest, treasurer of the mill, which will be for throwing raw silk, and which will have an equipment of 40,000 spindles. Steam power will be used.

—Rhode Island, Bristol. Work has been started on another new factory building here, the Textile Manufacturing Company, recently incorporated for manufacturing upholstery goods. The mill will be 170 by 40 feet, 2 stories. J. R. Milson, formerly of this place, is interested in the company.

Enlargements and Improvements.

—*Connecticut, Middletown. The new building for the Portland Silk Company is now under way, the granite foundation now being completed.

—*Connecticut, Middletown. It is expected to have the addition to the Portland Silk Company's mill in operation by July 1st.

—*Maryland, Ilchester. The Thistle Mill Co., which has recently completed erection of a new mill, with equipment of 200 looms, will soon start on erection of a dyeing plant

—Massachusetts, Pittsfield. Various alterations and additions are being made to the A. H. Rice & Co.'s plant.

—New Jersey, Paterson. A large number of looms are being installed in Barclay & Co.'s Silk Mill, at Clifton.

—*New Jersey, Port Oram. The new mill of the E. J. Ross Mfg. Co. has been put in operation. They have also installed some new machinery in the old plant.

—Pennsylvania, Lansdale. Enlargements and improvements are to be made to the Lanza Silk Co.'s plant.

—*Pennsylvania, Priceburg. A large addition is being built to the Priceburg Silk Mill, Valentine Bliss, proprietor. As soon as completed, Mr Bliss will remove his Providence Mill, now at Scranton, to this place.

—*Pennsylvania, Shamokin. Messrs. Kulp and Savidge have recently presented the Shamokin Silk Mills with some land, upon which they contemplate erecting a large addition, about next fall.

Mills Starting Up.

—*Pennsylvania, Kutztown. The Kutztown Silk Throwing Mills, A. R. Morrison, proprietor and manager, have begun operations.

Mills Shutting Down.

—New York, Fort Hunter. The Fort Hunter Silk Mill, operated by Dexter & Co., Ltd., has been shut down.

—*New York, Syracuse. Operations have begun in the new plant of the Syracuse Silk Company, recently incorporated at this place. Mr. Edwin S. Brown, formerly proprietor of the Hornellsville Silk Mill, will close that mill down, and remove the machinery to this pace.

Miscellaneous.

New Mills

—California, Oakland. A new $100,000 flax and twine mill will be established at this place, the Board of Trade have subscribed $1500 for improving the streets, a request of the new concern.

—Pennsylvania, Chester. An experimental plant for weaving linens is to be installed in the Chester Manufacturing Co.'s No. 1 Mill, and if it proves successful, they will erect a large new structure for manufacturing fine linen table cloths, napkins and other goods.

—Pennsylvania, Lewiston. C. B. Maxfield, formerly dyer for Thompson Bros., will engage, with others, in starting a job dye house at this place, to do work for the hosiery and yarn trade.

—Pennsylvania, Philadelphia. A new building is to be erected at the corner of Frankford Avenue and Mill Street by Mr. Robert Foerderer, for the Edgewater Print Works, now at Frankford Creek and Trenton Avenue. The main building will be 80 by 160 feet. Contract for erection has been let to George Kessler.

—*Pennsylvania, Yardley. The new bleaching plant to be established at this place by Theodore C. Search, Oscar W. White and others will be operated under name of the Cold Spring Bleaching and Finishing Works, for which application for charter has been made.

Enlargements and Improvements.

—*New Jersey, Paterson. The Lamond & Robertson Company inform us that they will install six new looms and one machine in the new addition now being built.

—New York, Garnersville. It is reported that the Rockland Print Works are to shut down for two months, during which time repairs will be made to the plant.

—Pennsylvania, Reading. A 150 h. p. engine is being placed in the Prospect Dye Works.

Mills Starting Up.

—*Massachusetts, Fall River. Operatios have been resumed in the American Print Works, recently closed for repairs.

—Massachusetts, Boston. The International Wool Scouring Co. has been incorporated with capital stock of $250,000 by F. Heath, J. F. Beaty, R. B. Wetherbee, J. T. Gilson, and H. H. Van Staggen, of Boston. They will make wool scouring apparatus.

PERSONAL RECORD.

Cotton.

—Stephen B. Ashley, for many years treasurer and agent for the Barnaby Mfg. Co., Fall River, Mass., has been succeeded by Arthur H. Mason, treasurer and agent of the Sanford Spinning Mill before it was purchased by the New England Cotton Yarn Co., and who has since managed it for that company.

—William Bottomley, overseer of spinning at the Weetamoe Mills, Fall River, Mass., has resigned.

—Wiliam Bagshaw, formerly assistant overseer of the carding department of the Wm. A. Slater Mills Corporation, Slatersville, R. I., is now boss carder of the Groveville Mills, Yardville, N. J.

—J. A. Boseman, formerly superintendent of the mill of the Quinn Mfg. Co., Petersburg, Va., has been apponted superintendent of the Levi Cotton Mills, Rutherfordton, N. C.

—W. P. Campbell, superintendent of the Efird Mfg. Co., Albermarle, N. C., has severed his connection with the concern, and J. D. Bacon, formerly overseer of carding at the Wiscasset Mill, Albemarle, is his successor.

—Thomas H. Conley has resigned his position with the Otis Co. at Ware, Mass. Mr. Conley intends to go to Georgia to superintend a cotton mill there.

—Edward Champagne is now overseer of weaving at the Parker Mill, Fall River, Mass.

—John Denton, late overseer at night with the Vance Cotton Mill, Chattanooga, Tenn., has accepted a position with the new Richmond Spinnning Mills in that city.

—James A. Dresser, who has been an overseer of weaving in the Laconia Mills, Biddeford, Me., for about 25 years, has resigned. Frank L. Hammond, a former Pepperell overseer, has succeeded him.

—George Florence, overseer of spinning with the Newman (Ga). Cotton Mills, has moved to Florence, Ala., to accept the superintendency of the Ashcraft Cotton Mills of that place.

—W. Franklin has succeeded N. Marsden as overseer of mule spinning at the Berkshire Cotton Mill, Adams, Mass.

—E. A. French, boss dresser at the Boott Cotton Mills, Lowell, Mass., has resigned.

—C. H. Goodroe, a former superintendent of the Cedartown (Ga.) Cotton Mill, has been appointed superintendent of the new Gwinnett Mill at Lawrenceville, Ga.

—William H. Hawkins has closed his labors as overseer of spinning in the China Mills, Suncook, N. H., and the room is now being looked after by E. P. Northrop.

—Akron Holley, loom fixer at the Warwick Cotton Mills, Augusta, Ga., has been promoted to the position of overseer of weaving, succeeding James Pardue.

—Vaughn Hildreth, of Adams, Mass., has accepted the position of overseer of the warping, slashing and spooling departments at the Eclipse Mill in North Adams.

—George McKenzie, overseer of dyeing for the William A. Slater Corporation, Slatersville, R. I., has severed his connection with the company, in whose employ he had been for eighteen years.

—Charles E. Meader, for a number of years manager of the Pontiac Bleachery, Pontiac, R. I., resigned June 1st, to accept a position with the Lowell Bleachery, Lowell, Mass., as superintendent.

—M. L. Moore, who has had charge of the spinning at one of the Odell Mills, of Concord, N. C., has accepted the superintendency of the new yarn mill at Harriman, Tenn.

—P. A. McGraw, secondhand in weave room No. 2 of the Henrietta (N. C.) Cotton Mills, has severed his connection with that company to become overseer of weaving in the Camden (S. C.) Cotton Mill, succeeding J. H. Booth. S. J. Whitaker, of Gaffey, S. C., will succeed him at Henrietta.

—Robert W. McAllister, for six years overseer of weaving at the Boott Cotton Mills, Lowell, Mass., is now with the North Pownal (Vt.) Mfg. Co.

—J. R. McCaskill, boss carder and spinner at the Maxton Cotton Mill, Maxton, N. C., has been appointed to succeed J. S. Smith as superintendent of the mill.

—Thomas O'Brien, secondhand of cone winding in the Appleton Mill, Lowell, Mass., has resigned to take full charge of winding, reeling and twisting for the Duck Mfg. Co., Lawrence, Mass.

—E. C. Pratt will be superintendent of the No. 1 mill of the Merrimack Mfg. Co., Lowell, Mass., to be erected at Huntsville, Ala.

—J. Priestley, boss carder at the New York Mills, N. Y., has resigned.

—Charles Arthur Rice ,assistant superintendent of the Southbridge Printing Co. at Southbridge, Mass., resigned recently to accept June 1st a position in Philadelphia.

—E. J. Steed, late overseer of weaving at the Revolution Cotton Mill, Greensboro, N. C., is now overseer of weaving in the Columbia Mill, Ramseur, N. C.

—J. S. Smith has resigned as superintendent of the Maxton Cotton Mills, Maxton, N. C., and J. R. McCaskill, carder and spinner in the mill, has been promoted to take his place.

—R. H. Smith has resigned the superintendency of the North Levi Cotton Mill, Rutherfordton, N. C., to accept a similar position at the Memphis Cotton Mills, Memphis, Tenn.

—Thomas Sullivan, formerly of the Durfee Mills, began work recently as overseer of the mule room in the Shove Mill No. 2, Fall River, Mass., succeeding John Baker.

—F. Tower is now boss carder at the May's Landing Water Power Co. at May's Landing, N. J., having succeeded T. Conroy.

—M. R. Vick, overseer of carding in the Meridian (Miss.) Cotton Mill, has resigned to accept a position with the Kearney (Neb.) Cotton Mill.

—Robert H. Wild, overseer of weaving in the Hargraves Mills, Fall River, Mass., has been appointed superintendent of the mill of the Peabody Mfg. Co., in Newburyport.

—Alex Achin, secondhand of spinning at the Fall River Iron Works, has accepted charge of ring spinning and spooling at the No. 2 Shove Mill, Fall River, Mass.

—W. C. York, overseer of weaving at the Columbia Mfg. Co., Ramseur, N. C., has resigned.

Woolen.

—Thomas E. Ainley now has charge of the card room for the Consolidated Wool & Felt Co., Amsterdam, N. Y.

—George Bidwell, owing to ill health, has resigned as overseer of the finishing department at the Simson & Kirkaldy Mill, Woonsocket, R. I.

—R. W. Barber, of Monson, Mass., has taken James A. Benjamin's position as superintendent at the Brown Woolen Mills, Foxcroft, Me.

—J. M. Baillie has been appointed manager of the Eureka Woolen Mfg. Co., Ontario, Canada.

—Paul Campbell, formerly overseer of carding for Van Brocklin & Stover, Amsterdam, N. Y., is now with Charles W. Becker of that city in a similar capacity.

—Charles Cholerton, formerly overseer of combing with S. B. & B. W. Fleisher, Philadelphia, has been appointed superintendent of the Phoenix Mills, Manayunk.

—J. J. Driscoll, late of Lebanon, N. H., has accepted a position as overseer of carding for the Endrick Woolen Co., Great Barrington, Mass.

—C. T. Dunlevy, of Uxbridge, Mass., has accepted charge of the weaving in the Oneko Mill, New Bedford, Mass.

—George E. Duffy, superintendent of the M. T. Stevens & Sons' woolen mill at North Andover, Mass., has resigned to accept the position of agent of the Charles River Woolen Co., Franklin, Mass. Mr. Duffy was presented with a Masonic charm by the overseers at the North Andover mill just previous to his departure.

—H. Drake has succeeded S. Watt as boss carder for the Raritan Woolen Mills, Raritan, N. J.

—Thomas Goddard is now boss finisher for the Penobscot Woolen Co., Dexter, Me.

—Lyman Hamm has recently accepted the position of overseer of weaving at the Raritan Woolen Mills, Raritan, N. J.

—J. Hiller, boss dyer at the Hampden Woolen Co., Dalton, Mass., has resigned.

—E. Hirst has resigned as boss carder at the Riverside Worsted Mills, Providence, R. I.

—P. F. Hanlin has recently accepted the position of boss finisher for Wm. E. Hayward & Co., East Douglas, Mass. Mr. Hanlin, for the past four and a half years, had been with the Assabet Mfg. Co. at Maynard.

—George Howarth, late of Geo. Campbell & Co., Philadelphia, has recently accepted the superintendency of the Chautauqua Worsted Mills at Jamestown, N. Y.

—A. S. Keach is now overseer in the finishing department of the Camden Woolen Co.'s mill at Camden, Me. He formerly worked for the C. G. Wood Mfg. Co.

—John J. Leonard, for many years employed as overseer of the carding department of the Collins Mill, Collinsville, Mass., resigned recently. Charles Madden, formerly overseer of the card room in the worsted department of the Washington Mills, Lawrence, is his successor.

—W. G. Loveland has succeeded Charles E. Johnson as boss carder at the Massasoit Mills, Huntington, Mass.

—Charles P. Madden, Jr., is now overseer of carding in the Collinsville (Mass.) Woolen Mills of the American Woolen Co. Mr. Madden was previously at the Washington Mills, Lawrence, Mass., filling a similar position.

—James Moorehouse, for many years with the Essex Felt Mills, Picton, N. J., is now with the Stroock Felt Co., Newburgh, N. Y., as superintendent.

—James E. Miller, boss finisher at the Warren Woolen Co., Stafford Springs, Conn., has resigned, and B. F. Welsh, of Lowell, Mass., has taken the position.

—Thomas Mullen, for about twenty years boss carder at Rochdale, Mass., has resigned in order to accept a position with Curtis & Marble, Worcester, Mass.

—Thomas E. Main, overseer of weaving at the Milner Mill, Moosup, Conn., has severed his connection with that company.

—E. Newell has resigned as overseer of spinning for the Madison (Me.) Woolen Co., on account of ill health.

—Joseph C. Pratt, formerly with the Lorraine Mfg. Co., Pawtucket, R. I., has accepted the superintendency of the new worsted mill started in Bloomfield, N. J., by Thomas Oakes & Co.

—Fitz L. Putney has resigned as superintendent of the Chapel Mills at Cherry Valley, Mass.

—Henry Pepler, overseer of the carding room of the Milner Co., Moosup, Conn., has resigned.

—William J. Rollinson, formerly over-

seer of finishing for the Hampden (Mass.) Mills Co., has accepted a similar position with Simson & Kirkaldy, Woonsocket, R. I.

—Thomas F. Ryan, formerly of Lebanon, N. H., is now filling the position of boss finisher for the Melrose Woolen Co., Auburn, N. Y.

—Daniel Welsh is now boss finisher for the Warren Woolen Co., Stafford Springs, Conn.

—J. W. Whitehead, formerly designer at Moosup, Conn., has become overseer of weaving at the Staffordville Woolen Mill, Staffordville, Conn.

—John W Whitworth, late of Ballardvale, Mass., has entered upon his new duties as overseer of carding and combing for James Roy & Co. at West Troy, N. Y.

Knit.

—Peter Burkhardt, boss carder at the Harder Knitting Co., Hudson, N. Y., has resigned.

—Herbert Chatfield, formerly of Cohoes, N. Y., has become assistant superintendent of the Lackawanna Knitting Mills, Scranton, Pa.

—M. C. Cuttle, for the past 14 years in charge of the dyeing department of the Shaw Stocking Co. at Lowell, Mass., has been appointed superintendent and dyer of the new Hooper Knitting Co.'s mill at Lowell.

—E. H. Ellis, formerly manager of the Olympia Knitting Mills, York, Pa., has recently accepted a position with the Hygienic Fleece-Lined Underwear Co. of Philadelphia, Pa.

—N. Farrington, formerly of Cohoes, is now with the Waterford Knitting Co., Waterford, N. Y., as boss carder.

—John Gatlip, boss carder for the Mechanicsville Knitting Mills, Mechanicsville, N. Y., has resigned.

—John Howell, overseer of carding for several years at the Paragon Knitting Mills, Mohawk, N. Y., recently resigned and accepted a similar position at Rockton, N. Y., Thomas Ritchie succeeding him at the Paragon Mills.

—D. Hall, of Utica, N. Y., has been appointed superintendent of the new knitting mill at Washington, Ga.

—John P. Kite has succeeded John Walsh as manager of Sambo & Regar's hosiery mill at Norristown, Pa.

—A. W. Kennedy, formerly of Germantown, is now boss carder with the Rockford Mitten & Hosiery Co., Rockford, Ill.

—Charles S. Parrish, formerly of Baldwinsville, Mass., has secured a position with the Alpha Knitting Co., of Schenectady, N. Y.

—Frank Rodman, formerly of Philmont, N. Y., is now secondhand in the knitting room of the Saratoga Hosiery Mills, Stillwater, N. Y.

—John Wheeler, formerly of Philadelphia, Pa., has recently accepted a position of boss carder for the Norfolk & New Brunswick Hosiery Co., Norfolk, Conn.

—H. M. Wright, who has filled the position of foreman in the seaming department of the Broadalbin Knitting Co., Broadalbin, N. Y., has been succeeded by W. L. Pitt.

—Fred Zee, overseer of carding at the Halcyon Mills, Cohoes, N. Y., recently accepted a position in a similar capacity at Bristol, Conn.

Deaths.

—Boetius Murphy, of Paterson, N. J., one of the best known silk men in the country, died very suddenly May 23d. He had been on a pleasure drive and stopped to view the trotting races at Dundee Driving Park when he was stricken with heart trouble and died almost immediately in his carriage. Mr. Murphy was born in Dublin in 1832, and was a graduate of Trinity College. He engaged in mining in Central America and Mexico, but owing to his health, was forced to relinquish this work. He then located in Paterson, where he became associated with John Ryle, a silk manufacturer, and afterwards engaged in the manufacture of broad silks and ribbons. He was associated later with William Ryle & Co., raw silk importers, of New York. His health had necessitated his retirement a short time ago. He leaves a widow and three children.

—John Holland, for many years one of the best known mill men in New England, died at his home May 29th, Dover, N. H., in his sixty-ninth year, after a protracted illness. The deceased was born in Padiham, Lancashire, Eng., May 1, 1831. He came to this country at the age of 20 and located in Fall River, where he was engaged in the grocery business. Later he moved to Taunton, Mass., where he learned the cotton business, and was chosen superintendent of the Taunton Cotton Mills, which position he held until 1878, when he was appointed superintendent of the mills of the Cocheco Mfg. Co. of Dover. Two years after his appointment as superintendent, he was chosen agent of these mills, and held this position for 19 years. Three sons and three daughters survive him.

—Solomon F. Cushman, a prominent woolen manufacturer of Monson, Mass., died at his home May 26th from the effects of a paralytic shock. Mr. Cushman was born November 18, 1826. In 1856 he accepted a position as bookkeeper for the Monson Woolen Co., which position he held for a period of ten years. He then secured an interest in the business, which he increased, until in 1878 he purchased the entire property, since which time he had operated two mills under the firm name of S. F. Cushman & Sons. He was a trustee, until recently, of the Monson Savings Bank, and was for many years its president, and also a director of the National Bank, and for a time its vice-president. He was treasurer of the public library at this place since its organization, and a director of the academy for many years. Six sons, who have been his associates in the woolen business, and one daughter, survive him. The death of Mr. Cushman removes from the town the last of the older business men.

—Chester Ballou Smith, of Woonsocket, R. I., one of the foremost of the young business men of that city, died in May, in his thirty-eighth year ,after an illness of about a year. He was president of the Woonsocket Machine & Press Co., treasurer of the Jenckesville Mills Co., director in the Morrill Knitting Co. and Dunn Worsted Co., and director of the Woonsocket National Bank and Woonsocket Institute for Savings. Mr. Smith was born in Woonsocket in 1863. After graduating from Dean Academy, he entered the employ of the American Worsted Co. to learn the business in all its branches. Later, he became agent of the company, a position he filled with marked success for a number of years.

—Thomas Kay, president and superintendent of the Thomas Kay Woolen Mills Co., Salem, Ore., died April 27th. He had been in ill health for several months, and died two weeks after entering St. Vincent's Hospital. The deceased was born in Applebridge, Yorkshire, Eng., in 1837. He was descended from a long line of woolen manufacturers, and from his youth was trained in that industry. He came to this country in 1857, and again in 1859, and worked in woolen mills. In 1875 he formed a partnership and bought a mill at Brownsville, which the firm operated until 1888, when Mr. Kay sold out his interest to his associates. He then spent some time in travel abroad, returning to Salem in 1889, and built and operated the Salem Woolen Mills. This plant was destroyed by fire in 1895, but was rebuilt, and is now in operation. In 1892 he built a mill at Waterloo for the manufacture of knitted hosiery and underwear, and this institution was in operation until it was burned in 1898. Mr. Kay had always been in sympathy with and had aided in movements for the betterment of the community. Much of the prosperity of the people of Salem is due to his energy and perseverance in maintaining and operating his mills at this place. During the hard times he kept his plant in operation, even at a loss, in order to give employment to operatives. His death was universally regretted.

—George L. Balcom, of Claremont, N. H., died May 13th, in his eightieth year. Mr. Balcom was a native of Sudbury, Mass. For several years previous to 1858 he was engaged in manufacturing woolen goods at Proctorsville, Vt., but in that year he removed to Claremont, where he became one of the leading woolen manufacturers of the State. He was widely known as a book collector, and possessed what was considered the finest and largest private library of historical books in New Hampshire.

—William L. Hutchins, assistant manager of the Crompton & Knowles Loom Works at Providence, and son of George F. Hutchins, general superintendent of the Crompton & Knowles Loom Works at Worcester, was instantly killed Wednesday morning, May 9th, while launching his boat. Mr. Hutchins entered the employ of the loom works under his father after graduating from school in 1893, and five years ago was promoted to the position of assistant manager of the Rhode Island works. He was 27 years old at the time of his death, and had always been universally esteemed.

—Robert R. Smith, one of the prominent citizens of New Hartford, Conn., died suddenly May 13th. He was the son of John C. Smith, who in 1848, with his brother, Darius B. Smith, came to New Hartford and with Maj. Sanford Brown established the manufacture cotton duck in this place, which has since developed into the Greenwoods Company and the firm of D. B. Smith & Sons. Robert R. Smith succeeded his father in the Greenwoods Company and for many years was agent and manager.

—Robert S. Olney, secretary and treasurer of the Geo. W. Olney Woolen Co., Cherry Valley, Mass., died in May. After leaving college he entered the woolen business with his father, and performed the duties of bookkeeper until he was obliged to leave the office of the company about three months ago, as he had not been in the best of health for some time. Mr. Olney always took an active interest in town affairs and at one time was a member of the school committee. He was also a director of the Leicester National Bank, stockholder of the Leicester Water Supply Co., and director of the Cherry Valley Cemetery Association. Besides a mother and one sister, he leaves three brothers, one, Thomas W., being president of the Geo. W. Olney Woolen Co.

—Benjamin Greenbank, a well-known former woolen manufacturer, died suddenly from heart disease last month, at his residence on Prospect St., Enfield, N. H., aged 75 years. He came from England to this country and engaged in the manufacture of woolen goods at South Danville, Vt., where he was very successful. In 1855 this mill was burned, and by the effort of the citizens of Enfield and a gift of the water power on the upper falls and $3000 in money, he was induced to locate at Enfield, and in 1886 erected a mill, three stories high, with a large weave shed and storehouse. For several years he did a good business, but under the depression in manufacturing business in 1893, was obliged to give up, and the plant was purchased in November of that year by the George Whitney Woolen Co., of Royalston, Mass. Since giving up the business, Mr. Greenbank had lived on his farm and carried on quite a large milk business, and on the morning of his death brought his milk to the station as usual.

—*Massachusetts, Fall River. The Hargraves and Parker Mills have been consolidated under the name of the Hargraves-Parker Mills, with capital of $1,600,000. Seth A. Borden holding position of treasurer with the new concern. This does not include the mills at Peabody, Mass.

—Massachusetts, Franklin. Fred P. Chapman has been appointed to succeed Edward H. Rathbun, as agent of the Ray's Woolen Mills, of the American Woolen Company, at Franklin.

—Massachusetts, Holliston. An assignment has been made by the Holliston Yarn Co., to Joseph P. Dexter, trustee. It is thought that the affairs will be settled so that arrangements may be made to continue the business.

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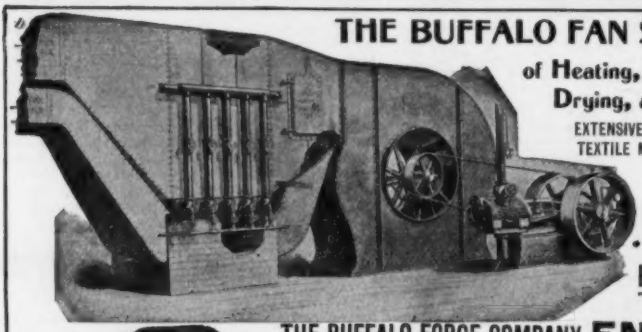

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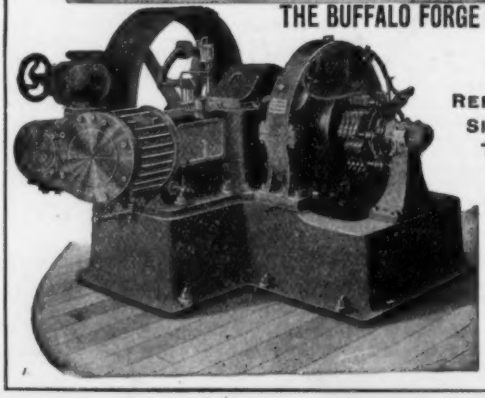

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Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

Alphabetical Index to Advertisements follows this Classified List.

Air Moistening System.
American Moistening Co., 150 Devonshire St., Boston.

Arc Lamps.
Lea Manufacturing Co., Elwood, Indiana.

Architects and Mill Engineers.
Berlin Iron Bridge Co. The, East Berlin, Ct.
Ferguson, John W., Paterson, N. J.
Tower & Wallace, Broadway and 25th St., New York, N. Y.

Artificial Stone.
Warren Bros. Co., 143 Federal St., Boston.

Asphalting & Asphalt Materials.
Warren Bros. Co., 143 Federal St., Boston.

Asphalt Roofing.
Warren Bros. Co., 143 Federal St., Boston.

Automatic Feeds for Cotton and Wool.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Balling Machine.
Torrance Mfg. Co, 18 Davis St, E. Newark, N. J.

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Belting.
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Link Belt Machinery Co., Chicago, Ill.
Popham, Henry, & Son, Newark, New Jersey.
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Belt Dressing.
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Bristols Co., Waterbury, Ct.

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Bleaching Materials.
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Parker, Henry Co, Springfield, Vt.
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Bridges.
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Card Clothing.
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Booth, Benj. & Co., Philadelphia.
Buck Card Clothing Co., Palmer, Mass.
Hammer, C. H. & Co., Philadelphia.
Leigh, Evan A, 35 Mason Building, Boston.

Card Grinding Machinery.
Hardy Machine Co., Biddeford, Me.
Roy, B. S. & Son, Worcester, Mass.

Carders' Tools.
Brown, W. H, Mechanic St, Worcester Mass.

Carpet Machinery.
Altemus, W. W, & Son, 2816 N. 4th St, Phila. Pa.
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Furbush, M. A, & Son, Machine Co, Phila, Pa.
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Howard, Geo. C., 1783 Barker St., Phila., Pa.

Cement "Dealers."
Warren Bros. Co., 143 Federal St., Boston.

Chemicals and Apparatus.
Bullock & Crenshaw, 528 Arch St, Phila, Pa.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Clutches.
American Tool & Machine Co., Boston, Mass.
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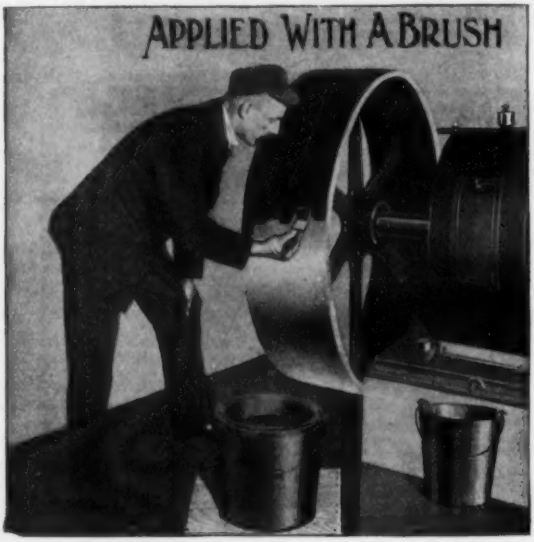
Hunter, James, Machine Co., North Adams, Mass.

Combs (Wool and Cotton).
Crabb, William, & Co, Newark, N. J.
Townsend, Thomas, 157 Orange St., Providence, R. I.

Commission Merchants (Dry Goods, Knit Goods).
Hirschman, H. 419 Broome St., New York.

Warren's Pulley Cover



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Leigh, Evan A, 35 Mason Building, Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
McKerrow, H. G. & Co., Boston, Mass.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
Philadelphia Textile Machinery Co, Hancock and Somerset Sts, Philadelphia, Pa.
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Schofield, Geo. L., Philadelphia.
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Howard & Bullough American Machine Co, Pawtucket, R. I.
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Kennedy, Thos. (Cutters, etc.,) Cohoes, N. Y.
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Moore, Benj. & Co., Brooklyn, N. Y.
Designers.
Freund, Eugene F., 140 Maiden Lane, New York.
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Lincoln, The, Co, 54 Arch St, Hartford, Ct.
Parks & Woolson Machine Co., Springfield, Vt.
Peel, Samuel H. Germantown, Philadelphia Pa.
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Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
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Hill, James Mfg. Co., Providence, R. I.
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Johnson, Wm. G, & Co, Uncasville, Conn.
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Stone & Ware Co, The, 157 Maiden Lane, N. Y.
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Thayer, Ed. M., 106 Broad St., Boston, Mass.

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Sturtevant, Co., B. F. Boston.

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Elastic Web Calendering Machines.
Knapp, C. H., Paterson, N. J.

Electrotyping and Printing.
Whitcomb, H. C, & Co, Boston.

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Cohoes Foundry & Machine Co, Cohoes, N.Y.
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Howard, Geo. C., 1783 Barker St., Phila., Pa.

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Philadelphia Electric Construction Co., Philadelphia.

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Buffalo Forge Co., Buffalo, N. Y.
Sturtevant Co., B. F., Boston.

Electric Motors.
Sturtevant Co., B. F., Boston.

Engine Foundations.
Warren Bros. Co., 143 Federal St., Boston.

Engineers, Mechanical.
Berlin Iron Bridge Co., The, East Berlin, Conn.
Ferguson, John W, Paterson, N. J.
Rittenhouse, Frank, Norristown, Pa.

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Burt Manufacturing Co , Akron, Ohio.

Fans—Exhaust and Ventilating.
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Pendleton, Walter & Co., New York.

Feed Water Pumps.
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Phœnix Iron Foundry, Providence, R. I

Finishing Machinery.
See Dyeing, Drying, Bleaching and Finishing

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Sturtevant Co., B. F., Boston.

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Friction Hoisting Drums.
Eastern Machinery Co., New Haven, Conn.

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Sturtevant Co., B. F , Boston.

Heating.
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American Tool & Machine Co , Boston.
Rusden Machine Co., Warren, R. I.
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Nye & Tredick, 606 Arch St, Phila, Pa.
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Paxton & O'Neill, 129 Bread St, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.

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American Knitting Machine Co., 115 Wickenden St., Providence, R. I.
Beattie, Wm. & Son, Cohoes, N. Y.
Branson Machine Co., 506 John St., Philadelphia.
Campbell & Clute, Cohoes, N. Y.
Cooper, Chas, Bennington, Vt.
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Excelsior Knitting Machine Manufacturing Co., Allentown, Pa.
Fisher Knitting Machine Co., Utica, N. Y.
Franklin Transfer Co., Franklin Falls, N.H.
Hepworth & Co, Lehigh Ave. and Mascher St, Phila, Pa.
Jenckes, E. Mfg. Co, Pawtucket, R. I.
Jones, Lewis, 60 1-2 and Media Sts, Philadelphia, Pa.
Kennedy, Thos. (Cutters, etc.), Cohoes, N. Y.
Leighton Machine Co, Manchester, N. H.
Lindley. Geo. W., 5122 Wakefield St., Germantown, Pa.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
McMichael & Wildman Mfg. Co, Norristown, Pa.
Nye & Tredick, 606 Arch St, Phila, Pa.
Paxton & O'Neill, 127 Bread St, Phila, Pa.
Pepper Mfg. Co, Lakeport, N. H.
Scott & Williams, 2079 E. Cumberland St., Phila., Pa.
Snyder, Homer P. Mfg. Co. Little Falls, N. Y.
Stafford & Holt, Little Falls, N. Y.

Knitting Needles and Supplies.
Breedon, Wm, & Son, Amsterdam, N. Y.
Cooper, Chas, Bennington, Vt.
Corey, Wm, Co, Manchester, N. H.
Crane Mfg. Co , Lakeport, N. H.

Dodge Needle Co., Manchester, N. H.
Ives, Loyal T, New Brunswick, N. J.
Kavanaugh, Geo. W., Cohoes, N. Y.
Lydall, H, & Foulds, Manchester, Conn.
Manufacturers' Supplies Co., 66 No. 4th St. Philadelphia.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Page Needle Co, Chicopee Falls, Mass.
Treat, Orion, Manchester Green, Conn.
Wardwell Needle Co, Lakeport, N. H.

Laboratory Outfits.
Bullock & Crenshaw, 528 Arch St. Phila, Pa

Looms.
Crompton & Knowles Loom Works, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A, & Son Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St, Phila., Pa. (For wire.)
Kilburn, Lincoln & Co, Fall River, Mass.
Leigh, Evan A., 35 Mason Bldg., Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Whitin Machine Works, Whitinsville, Mt,
Woonsocket Machine & Press Co, Woonsocket, R. I.

Lubricators.
Ameledema Oilless Bearing Co., Berkeley St., Wayne Junction, Philadelphia.
Dixon, Jos., Crucible Co, Jersey City, N. J.

Lumber.
Stearns, A. T, Lumber Co, Neponset, Mass.

Lumpers.
Gerry, George, & Son, Athol, Mass.

Machinery Dealers.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Schofield, Geo. L. Phila., Pa.

Machinists' Tools.
Whiton, The D. E. Co, New London, Conn.

Mails.
Walder, J, Paterson, N. J.

Manufacturers' Agent.
Cunningham, Jas. D, 1001 Chestnut St, Philadelphia, Pa.

Mechanical Draft.
Buffalo Forge Co., Buffalo, N. Y.
Sturtevant Co., B. F., Boston.

Measuring and Folding Machines.
Curtis & Marble Machine Co, Worcester, Ms.
Elliott & Hall, 54½ Hermon St, Worcester Mass.

Mercerizing Machinery.
Butterworth, H. W. & Sons, Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Rusden Machine Co., Warren, R. I.

Mill Brushes.
See Brushes.

Mills For Sale.
Denny, R. B., 143 Federal St., Boston.

Mill Builders and Engineers.
Berlin Iron Bridge Co, The, East Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Mill Supplies.
American Supply Co, Providence, R. I.
Bamford & Smith, Pascoag, R. I.
Bristol, The, Co., Waterbury, Conn
Buckley's, Benj. Son, Gun Mill, Paterson, N. J.
Dixon Lubricating Saddle Co., Bristol, R.I.
Easton-Burnham Co., Pawtucket, R. I.
Holmesburg Banding Mfg. Co., Holmesburg, Pa.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Jeffrey Manufacturing Co., Columbus, O.
Thurston, A. G, & Son, Fall River, Mass.
Watson, L. S, Mfg.Co, Leicester, Mass.

Napping Machines.
American Napping Machine Co, Williamstown, Mass
Ardrey, S. B, & Sons, Bristol, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Jones, Lewis, 60 1-2 and Media Sts., Philadelphia, Pa.

Noils (Silk.)
Champlain Silk Mills, Whitehall, N. Y.
Ryle, Wm. & Co., 54 Howard St., N. Y.
Malcolm Mills Co., Frankford, Pa.

Oil Filters.
Burt Manufacturing Co., Akron, Ohio.

Packing.
Boston Belting Co, Boston.
Jenkins Bros., New York.

Paint.
DeRonde, F. S. Co, 54 John St., New York City.
Moore, Benj. & Co, Brooklyn, N. Y.

Painting and Whitewashing Machine
Triumph Machine & Manufacturing Co. 209 Hester St., New York, N. Y.

Pantagraphs for Mill Engraving.
Johnson, C. A, & Co, 22 Dey St, New York.

Patterns of European Novelties.
European Pattern Supply Co., 530 Broadway, N. Y.

Patent Solicitors.
Crosby & Gregory, 34 School St, Boston, Mass.
Siggers, E. G., Washington, D. C.
Wright, Brown & Quinby, 53 State St, Boston, Mass.

Pavers & Paving Materials.
Warren Bros. Co., 143 Federal St., Boston.

Perforated Metal.
Beckley, A. J. & Co., Garwood, N. J.
Fraser & Chalmer, Chicago, Ill.
Harrington & King Perforating Co., 230 North Union St, Chicago. Ill.

Peroxide of Sodium.
Roessler & Hasslacher Chemical Co., 100 William St, New York.

Picker Sticks.
Loom Picker Co., Biddeford, Me.

Picking, Carbonizing and Garnetting.
Garfield Woolen Co, Garfield, N. J.

Pipe Covering.
Keasby, R. A. 83 Warren St, New York.
Norristown Covering Co., Norristown, Pa.

Pneumatic Conveying.
See Ventilating.

Power Transmitting Machinery.
Ameledema Oilless Bearing Co, 149 West Berkley St, Wayne Junction, Pa.
Channon, H, Co, 25 Market St, Chicago, Ill.
Christiana Machine Co., Christiana, Pa.
Eastern Machinery Co, New Haven, Conn.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunter, Jas, Machine Co, No. Adams, Mass.
Jeffrey Manufacturing Co., Columbus, O.
Kilburn, Lincoln & Co, Fall River, Mass.
Link Belt Machinery Co, Chicago, Ill.
Rusden Machine Co., Warren, R. I.
Saginaw Manufacturing Co., Saginaw, Mich.

Presses.
Boomer & Boschet Press Co., 338 West Water St., Syracuse, N. Y.
Butterworth, H. W. & Sons Co., Philadelphia
Crawford, J. J, & Son, Nashua, N. H. (Power Screw, Hydraulic, Hollow Steam Plate.)
Curtis & Marble Machine Co, Worcester, Ms.
Hart, Charles, Frankford, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Phillips Co, The Thomas, Providence, R. I.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Printers (Fabrics and Yarn.)
Capstick, John & Sons, Montville, N. J.
American Yarn Printing Works, Philadelphia.

Pulleys.
See Power Transmitting Machinery.

Pulley Covers.
Warren Mfg, Co., Chicago, Ill.

Pumps.
Goulds Mfg. Co, Seneca Falls, N Y.
Rusden Machine Co., Warren, R. I.

Quills.
Parker, Henry Co, Springfield, Vt.

Reed and Harness Manufacturers.
American Supply Co, Providence, R. I.
Walder, J, Paterson, N. J.

Ribbons.
Cheney Bros, S. Manchester, Ct.

Ring Travellers.
Dellaven Mfg. Co, The, 50 Columbia Heights, Brooklyn, N. Y.
National Ring Traveller Co., Providence, R. I.
Morley Button Mfg. Co., Boston.

Roofing Asphalt.
Warren Bros. Co., 143 Federal St., Boston.

Roofing, Gravel, Slag and Composition.
Armitage Mfg. Co, Richmond, Va.
Eastern Granite Roofing Co., Jersey City N. J.

Roofing Materials (Manufacturers).
Warren Bros. Co., 143 Federal St., Boston.

Roofing, Paint and Paper.
Armitage Mfg. Co, Richmond, Va.
Warren Bros. Co., Boston, Mass.

Rope Transmission.
American Mfg. Co., New York.
Channon, H. Co., Chicago.
Holmesburg Banding Mfg. Co., Holmesburg, Pa.

Rove Traverse.
Rawlins, J. H, Chester, Pa.

Roving Cans.
Hill, James Mfg. Co., Providence, R. I.
N. E. Ventilating & Heating Co, 980 Manton Ave, Providence, R. I.
Laminar Fibre Co., No. Cambridge, Mass.
Walrus Fibre Mfg. Co., Medford, Mass.

Rubber Covered Rollers and Goods.
Boston Belting Co., Boston.

Saddles and Stirrups.
Dixon Lubricating Saddle Co., Bristol, R. I.

Schools.
American Correspondence School of Textile, New Bedford, Mass.
Lawrence Scientific School, Cambridge, Mass.
Lowell Textile School, Lowell, Mass.
New Bedford Textile School.
Philadelphia Textile School, Phila, Pa.

Screens (Perforated.)
See under Perforated Metal.

Sewing Machines and Supplies.
American Machine Co., 429 Library St., Phila.
Birch Bros., Somerville, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Excelsior Sewing Machine Co., Philadelphia.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Nye & Tredick, 606 Arch St, Phila, Pa.
Rusden Machine Co., Warren, R. I.
Standard Sewing Machine Co, Cleveland, Ohio.
Scott & Williams, 6th and Arch Sts, Phila, Pa.

Shearing Machinery.
See Dyeing, Drying, Bleaching and Finishing.

Shell Rolls.
Cohoes Foundry & Mach. Co, Cohoes, N. Y.
Thurston, A. G, & Son, Box 538, Fall River, Mass.

Shoddies.
See Wool Shoddies.

Shuttles.
See Bobbins, Spools, Shuttles, Etc.

Silk Machinery.
Butterworth, H. W. Sons Co, Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Knapp, C. H., Paterson, N. J.
Mason Machine Works, Taunton, Mass.
Rusden Machine Co., Warren, R. I.
Webendorfer & Walling, Paterson, N. J.

Singe Plates.
Butterworth, H. W. Sons Co., Philadelphia.
New Bedford Copper Co, New Bedford, Mass

Sizing, Starch and Gums.
Stein, Hirsch & Co, 165 Duane St, New York.

Slashers.
Cohoes Foundry & Machine Co, Cohoes, N. Y.
Lowell Machine Shop, Lowell, Mass.
Phillips Co, The Thomas, Providence, R. I.

Soaps.
India Alkali Works, Boston, Mass.

Spindles.
Bamford & Smith, Pascoag, R. I.
Buckley, Benj's, Sons, Gun Mill, Paterson, N. J.
Draper Company, Hopedale, Mass.
Easton-Burnham Co., Pawtucket, R. I.
Ward & Vandegrift, Elmer, N. J.
Whitin Machine Wks, Whitinsville, Mass.

Spindle Tubes.
Bamford & Smith, Pascoag, R. I.

Spinning Cylinders.
N. E. Ventilating & Heating Co, 980 Manton Ave, Providence, R. I.

Spinning Frames.
See Cotton Machinery.

Spinning Frames for Wool
Woonsocket Machine and Press Co., Woonsocket, R. I.

Spinning Rings.
Draper Company, Hopedale, Mass
Morley Button Mfg. Co., Boston, Mass.
Whitinsville Spinning Ring Co, Whitinsville, Mass.

Spinning Tubes.
Buckley, Benj's. Son, Gun Mill, Paterson, N. J.

Spools. *See Bobbins, Spools Shuttles, Etc.*

Sprinklers.
International Sprinkler Co., Philadelphia, Pa.

Stamps and Checks.
Michael, A. M. Albany, N. Y.

Steam Boilers.
Brown, C. H, & Co, Fitchburg, Mass.
Lee-Odlum Co., Memphis, Tenn.
Pendleton, Walter & Co., New York.

Steam Boiler Compound.
Straus & Co., 55 Broad St., New York.

Steam Boiler Insurance.
Hartford Steam Boiler Inspection & Insurance Co, Hartford, Conn.

Steam Engines.
American Blower Co, Detroit, Mich.
Babcock & Wilcox Co., The, 29 Cortland St., New York City.
Brown, C. H, & Co, Fitchburg, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Hooven (The), Owens & Rentschler Co, Hamilton, O.
Pendleton, Walter & Co., New York.
Rusden Machine Co., Warren, R. I.
Sturtevant, B. F. & Co., Boston.

Steam Surface Coverings.
Kenseey, Robert A., New York.
Norristown Covering Co., Norristown, Pa.

Steam Specialties.
Butterworth, H. W. Sons Co., Philadelphia.
Rusden Machine Co., Warren, R. I.
Jenkins Bros., New York.
Sturtevant Co., B. F., Boston.

Steam Valves.
Jenkins Bros., New York.

Tanks, Tubs and Vats.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Cypress Lumber Co, Apalachicola, Fla.
Lee-Odlum Co., Memphis, Tenn.
Rusden Machine Co., Warren, R. I.
Stearns, A. T, Lumber Co, Neponset, Mass.
Woolford, George, 2240 No. 9th St, Phila, Pa.

Tapes, Braids and Edgings.
Cathcart, John, & Co, 115 Franklin St, N. Y.
Fleming & Chapin, Philadelphia.
Friedberger Mfg. Co, Germantown, Pa.
Krout & Fite Mfg. Co., Allegheny Ave. and Emerald St., Philadelphia.
Weimar Bros, 1817 East York St, Phila, Pa.

Telephones.
Mianus Electric Co., Mianus, Conn.
Philadelphia Electric Construction Co,

Philadelphia.
Plummer, F. O. 620 Atlantic Ave., Boston.

Tentering Machines.
See Dyeing, Bleaching Machinery, Etc.

Tension Pulleys.
Ameledema Oilless Bearing Co., Wayne, Junc., Phila. Pa.
N. E. Ventilating & Heating Co, 980 Manton Ave, Providence, R. I.

Testing Machines.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Towers.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Lee-Odlum Co., Memphis, Tenn.

Trimmers.
The American Machine Co., 420 Library St., Philadelphia.
Excelsior Sewing Machine Co, Philadelphia.

Turbines.
(See Water Wheels.)

Valves—Rubber.
Boston Belting Co., Boston, Mass.

Ventilating Apparatus.
Allington & Curtis Mfg. Co., Saginaw, Mich., 81 Wareham St., Boston.
American Air Moistening Co., Boston.
American Blower Co., Detroit, Mich.
Berry, A. Hun, 23 W. 1st St, Boston, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Mattern, Geo. 44 East 8th St., New York.
New England Ventilating & Heating Co, Providence. R. I.
New York Blower Co., New York.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philapelphia.
Philadelphia Textile Machinery Co, Hancock St, above Lehigh Ave, Phila, Pa.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Wall Whitening.
DeRonde, F. S. Co, 54 John St, New York City.
Moore, Benj. & Co, Brooklyn, N. Y.

Washers (Cloth).
Birch Brothers, Somerville, Mass.
Butterworth, H. W. & Sons Co., Philadelphia.
Hopkins, Machine Works, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Phillips Co, The Thomas, Providence, R. I.
Rusden Machine Co, Warren R. I.
Webendorfer & Walling, Paterson, N. J.

Waste.
Kay, John J, Philadelphia, Pa.

Watchman's Clocks.
Eco Magneto Clock Co, 620 Atlantic Ave, Boston.
Nanz & Co, 127 Duane St., New York.
Philadelphia Electric Construction Co., 1328 Chestnut St., Philadelphia.
Waggoner Watchman Clock Co, Grand Rapids, Mich.

Waterproof Floors.
Warren Bros. Co., 143 Federal St., Boston.

Water Wheels.
Bradway, C. P., W. Stafford, Ct.
Christiana Machine Co., Christiana, Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Leffel, James, & Co, Springfield, O.

Water Wheel Governors.
Bradway, C. P, West Stafford, Ct.
Cohoes Foundry & Machine Co, Cohoes, N. Y.
Leffel, James & Co, Springfield, Ohio.
Lombard Water Wheel Governor Co, 61 Hampshire St, Boston.

Winders. (Hosiery.)
Universal Winding Co, 226 Devonshire St, Boston.

Wire Cloth.
Fraser & Chalmer, Chicago, Ill.

Wire Goods.
DeHaven Mfg. Co, The, 50 Columbia Heights, Brooklyn, N. Y.

Wood Pulleys.
Saginaw Manufacturing Co, Saginaw, Mich.

Wool Cleaning Compound.
India Alkali Works, Boston.

Wool Combing Machinery.
Crompton & Knowles Loom Works, Worcester, Mass.
Leigh, Evan A. 35 Mason Bldg., Boston.

Wool Extracts.
Garfield Woolen Co, Garfield, N. J.

Wool and Waste Dusters.
Gerry, Geo, & Son, Athol, Mass.
Sargents', C. G., Sons, Graniteville, Mass.
Stillman-Randall Machine Co, Westerly, R. I.

Woolen and Worsted Machinery.
Altemus, W. W, & Co, 2816 N. 4th St, Phila, Pa.
American Tool and Machine Co., Boston.
Birch Brothers, Somerville, Mass.
Butterworth, H. W. Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A. & Son Machine Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Kenyon D. R. & Son, Raritan, N. J.
Leigh, Evan A. 35 Mason Bldg, Boston.
Parks & Woolson Machine Co., Springfield, Vt.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Philadelphia.
Phillips Co. The Thomas, Providence, R. I.
Roy, B. S. & Son, Worcester, Mass.
Rusden Machine Co., Warren, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Schofield, Geo. L., Philadelphia.
Smethurst, Geo. (Gears for Mules), Maynard, Mass.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Woonsocket Machine & Press Co Woonsocket, R. I.

Wool, Hair and Noils.
Becker, Chas. W, Agt, Amsterdam, N. Y.
Fowles & Co, 106 Church St, Phila.

Wool Shoddies.
Becker, Chas. W, Agt, Amsterdam, N. Y
Garfield Woolen Co, Garfield, N. J.
Slack, Wm. H. H., & Bro, Springfield, Vt.

Wool Washing, Preparing and Drying Machinery.
Hunter, Jas. Machine Co., No. Adams, Mass.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G, Sons, Graniteville, Mass.

Woolen Commission Merchants.
Hayes, O. H. & Co., New York.

Yarns, Threads, Etc.

Banding.

Frost, Geo. T, Paterson, N. J.
Moore, C. & Co, 12 S. 5th St, Phila, Pa.
Warren, W, Thread Works, Westfield, Mass.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

Cotton Yarns.

American Cotton Yarn Exchange, 67 Chauncy St., Boston.
Catlin & Co, New York and Boston.
Dexter Yarn Co., Pawtucket, R. I.
Eddy & Street, Providence, R. I.
Spring St., N. Y.
Eichmann & Sternberg, New York.
Germantown Spinning Co, Germantown Pa.
Grant Yarn Co, Fitchburg, Mass.

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Mitchell, Jas. E, & Co, Boston and Phila, Pa.
Montgomery, J. R, Co, Windsor Locks, Ct.
Monument Mills, Housatonic, Mass.
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New England Thread Co., Pawtucket, R. I.
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Eichmann & Sternberg, New York.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
New England Cotton Yarn Co , New Bedford, Mass.

Glazed Yarns.

Indian Orchard Co., Indian Orchard, Mass.
Lorimers, Wm. H. & Sons Co., Philadelphia.
Malcolm Mills Co, Frankford, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
New England Thread Co., Pawtucket, R. I.
Warren, W, Thread Works, Westfield, Mass
Whittier Cotton Mills, Lowell, Mass.

Harness Twines.

Cranston Worsted Mills, Bristol, R. I.
Fawcett, Hughes, 115 Franklin St., N. Y.
Moore, C., & Co., (S. W. cor. 5th and Market Sts.)
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.

Hosiery and Knitting Yarns.

Boyer, B. F, & Co, Camden, N. J.
Campbell, Geo, & Co, Phila, Pa.
Champlain Silk Mills, Whitehall, N. Y.
Cranston Worsted Mills, Bristol, R. I.
Dexter Yarn Co., Pawtucket, R. I.
Germantown Spinning Co, Germantown, Pa.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E., Manufacturing Co, Pawtucket, R. I.
Mitchell, James E, & Co, Phila. and Boston.
Monument Mills, Housatonic, Mass.
New England Cotton Yarn Co., New Bedford, Mass.
Orswell Mills, Fitchburg Mass.
Platt Bros, Manayunk, Pa.
Skerry, A T, & Co, 47 Leonard St, N. Y.
Walcott & Campbell Spinning Co, New York Mills, Oneida Co, N. Y.
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.
Wolstenholme & Clark, Baker and Mallory Sts., Manayunk, Pa.

Mohair Yarns.

Cranston Worsted Mills, Bristol, R. I.
Goff, D. & Sons, Pawtucket, R. I.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Novelty Yarns, Tinsels, Silk Noils, Etc.

Champlain Silk Mills, Whitehall, N. Y.
Cranston Worsted Mills, Bristol, R. I
Indian Orchard Co., Indian Orchard, Mass.
Malcolm Mills Co, 229 Chestnut St, Phila, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Silk Yarns.

Champlain Silk Mills, Whitehall, N. Y.
Cheney Bros, S. Manchester and Hartford Ct.
Eddy & Street, Providence, R. I.
Ryle, Wm, & Co, 54 Howard St, N. Y.

Woolen and Merino Yarns.

Boyer, B. F, & Co, Camden, N. J.
Eddy & Street, Providence, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E. Mfg. Co., Pawtucket, R. I.
Platt Bros, Manayunk, Pa.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

Worsted Yarns.

Alleghany Worsted Mills, Phila, Pa.
Boyer, B. F, & Co, Camden, N. J.
Campbell, Geo. & Co, Phila, Pa
Campion, Richard, 17 Bank St., Philadelphia.
Cranston Worsted Mills, Bristol, R. I.
Croft, Howland, & Sons, cor. Broadway and Jefferson Ave., Camden, N. J.
Goff, D. & Sons, Pawtucket, R. I.
Herbst & Jones, 21st and Naudain Sts, Philadelphia, Pa.
Pocasset Worsted Co., Thornton, R. I.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Waverly Worsted Co, Main St. and Green Lane Manayunk, Pa.
Wolstenholme & Clark, Baker and Mallory Sts., Manayunk, Pa.

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1700 **Supt.** of small mill, or carder in a large one. Has had twenty years' experience in the different rooms on plain and colored goods. Age 35; married. Strictly temperate. References first-class. Now employed, but could take a place at short notice.

1686 **Cotton Supt.** Age 53; American; married. Large experience. Been in present position as superintendent for a number of years and previously in the same mill as overseer of weaving. Nearly all kinds of goods Is familiar with nearly all makes of machinery. Refers to past employers.

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1673 **Cotton Supt., Carder, and Spinner.** Age 25; English; single. Large experience in English mills. Can take position at once. Has worked on all kinds of cotton machinery.

1532 **Superintendent.** Has been in mill business all his life, and been with the present firm for a number of years, having been promoted several times He wishes to better himself.

WOOLEN SUPERINTENDENTS.

1682 **Supt. & Designer,** or would take a position as designer and asst. supt. in a good mill at $1500 per year. Has had 14 years' experience in woolen and worsted mills from pattern weaver, loom fixer, boss weaver, designer. Men's wear, wool and worsteds and dress goods. Best of references.

880 **Supt. or Assistant Supt. and Designer.** Over 25 years' experience as supt. and designer. Has designed and manufactured nearly all classes of goods made in a woolen mill, in wool and worsted, such as shawls, blankets, beavers, kerseys, cheviots, fancy cassimeres, overcoatings, worsted suitings, etc. 53 years old; married, with family. Would go West or nearly anywhere. Wants a mill where he can permanently settle and give them the benefit of his experience as a manufacturer. A first-class man.

1683 **Woolen Supt.** Large experience. Last mill where he was employed was for five years overseer and 15 as superintendent. A good man on flannels, sackings, skirtings, woolen dress goods and domestic woolen goods. Well up in weaving, dyeing, carding, etc., and has a general knowledge of all departments in a Western woolen mill. Englishman; married. Refers to past employers.

1674 **Supt.** or assistant in woolen mill. 10 years' experience on cassimeres, cloakings, etc. Well posted on shoddies. First-class references. Strictly temperate. Age 29; American; single.

1386 **Woolen Superintendent** or Boss Carder. Age 43; American. Familiar with the manufacture of all kinds of woolen goods, is well recommended, and can go immediately.

1594 **Supt. of 5 to 10 Worsted** Combing Mill, or asst. supt. in a larger mill, or good position as drawer or drawer and spinner. Wants $3.50. Has worked on fine, medium and coarse wools, numbers principally from 14 to 50 in the gray and fancy mixes. Had seven years' experience in England and 10 years' experience in a mill in this country. Can take place at once.

1610 **Woolen Supt. or Dyer.** Large experience as dyer and assistant supt. on broadcloths, kerseys, dress goods and men's wear. Age 36; American, married.

1387 **Woolen Superintendent,** one who has had a thorough practical experience in setting up and operating woolen mills. Would take charge of small mill or finishing department in large mill. Now employed but wishes to change. Correspondence solicited.

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1696 **Carder**, or secondhand. Experienced on cassimeres, cloakings, blankets, shawls, jeans, and is familiar with Furbush, Bridesburg and Smith cards. Wants position in Western or Southern States. Can take place immediately. Age 30; American; single.

1701 **Boss Carder.** Age 39; English; married. Has had large experience as boss carder in Canadian mills, and has worked in New England mills, also held positions in England before coming to this country. He has worked on all kinds of wool, cotton, waste, mungo and shoddy mixes, cassimeres, dress goods, knit goods and blankets. Can take position at once. Excellent references.

1707 **Overseer of Carding.** Worked for 21 years in a woolen mill as boss carder, but through sickness was obliged to resign his position. Is now ready and wants a situation at once. Age 49; American; married. Wants $3 a day. Has worked on dress goods and flannels.

1643 **Woolen Carder.** Age 45; American; married. Has worked as overseer in first-class N. E. mills for the past 18 years. He is at present employed, but wishes to better himself. Could leave on a week's notice. Has worked on cassimeres, dress goods, flannels and underwear. A good manager of help and thoroughly competent and reliable.

COTTON CARDERS.

1403 **Cotton Carder** with 17 years experience in N. E. mills as overseer and second-hand, now in the South but wants to return North. Has never worked for less than $3.00 but would take $2 50 to change. Married. Age 38. Best of references.

1662 **Overseer Cotton Card Room.** Age 53; American, married. Not employed at present and could take a position at once. Has worked on all kinds of goods in order mills, and is familiar with all kinds of machinery. Refers to former employers.

1593 **Overseer Cotton Carding and Combing.** Now in charge of this department in a large N. E. mill. Has had first-class experience and is well recommended. Age 38; married, American. All grades of cotton.

1718 **Second-Hand in Cotton Card Room.** Has had 10 years' experience in N. E. mill. Understands all makes of machines. Can make all changes from 1 to 20 hank. Has taken course in cotton spinning at American Correspondence School of Textiles. New Bedford. First-class references. Would start at $2 00 a day. Young man and strictly temperate.

1720 **First Class Cotton Carder or Supt.** Has had the advantage of a great deal of experience in the various departments, and is thoroughly posted on all details of manufacturing and machinery. Would accept a position North or South. 36 years of age; American; married. Worked on print cloths, twills and sheetings. Has had charge of bleaching.

1736 **Overseer Cotton Card Room and Combing.** Age 39; married. Has been overseer for past nine years. In last position seven years. Started up two large rooms with combers in each. Thoroughly understands all machinery in card room, and has run all grades of cotton. Can furnish references, if required.

WOOLEN SPINNERS.

1648 **Boss Woolen Spinner.** 47 years old. 28 years' experience. Worked on all kind of stock, from ¼ to 12 run. Temperate, steady, and refers to past employers. Will work for moderate salary. Not employed and could come at once. Experience on cassimeres, flannels, beavers, knit goods dress goods, blankets, shawls.

1519 **Overseer of Woolen Spinning.** Age 31; married. Has worked on yarns from 1 run down to 5½. Some experience on shoddy. Will work for moderate salary.

1595 **Overseer Worsted Spinning.** 10 years as overseer of spinning, twisting, reeling, dressing, spooling on worsted yarns Englishman; age 41, married. Now employed, but does not like section of country. A first-class man in every respect.

1709 **Worsted Spinner or Section Hand.** Age 22 and unmarried. At present employed, but not satisfied with surroundings. Would accept moderate pay.

1601 **Woolen Spinner**, or painter and glazer in any kind of mill. Age 31; Irish; married. Wants $10 50 per week. Has worked on cheviots, overcoatings, broadcloths, satinets, hosiery, yarns, etc.

1647 **Overseer Cotton Mule Spinning.** Seven years' experience as secondhand. Wishes to get an overseer's job. Prefers Mason mules. Age 38; Catholic, married. At present employed Experience on prints, sateens, lawns, twills, etc. Will work for moderate salary.

COTTON SPINNERS.

1636 **Overseer Cotton Spinning, Spooling, Warping, Etc.** Has held position seven years of second-hand and has taken textile school courses. Having had unusual opportunities to learn, he feels competent to take position as overseer. Highly recommended by present employers.

1655 **Overseer of Cotton Spinning.** 42 years old; married. Experience as a spinner covers a period of 30 years in first-class N. E. mills. Has worked principally on fine yarns, 30's to 200's. Had some experience on coarse numbers. First-class references.

1364 **Mules or Frames.** 34 years old; married. Thoroughly understands all makes of English and Mason mules. Has set up machinery and been expert fixer. Wants good position as overseer of mule room, or would take charge of frames. Accept $3.50 per day. Best references.

1663 **Overseer Mule Room.** Eleven years' experience in Fall River mills, and for the past ten years overseer of mule room. Excellent reference from present employer. Age 44, married.

1698 **Overseer of Mules.** 34 years old; married; English. 10 years' experience, chiefly on English mules, on all grades of cotton yarn. Would like to get a large job.

1703 **Overseer Ring Spinning, Warping and Spooling.** Is experienced on white work from Nos. 4's to 30's. Is familiar with Whitin and Lowell Machine Shop spinning frames and spoolers and warpers. Wants $3 per day to start with. Age 39; American; married.

1690 **Cotton Mule Spinner.** Age 42; French; married. Has worked on prints and sheetings and on yarns from 9's to 50's. First class references. Two years' experience as secondhand and five as overseer. Wants $2.50 per day to start with.

WOOLEN WEAVERS.

1654 **Boss Woolen Weaver.** Has had 12 years' experience as fixer and two years' as boss weaver. Has worked on fancy worsteds, cotton worsteds and coverts. Is familiar with Crompton & Knowles machines. Age 37; English, married. At present employed. Can take a position with two weeks' notice.

1482 **Weaver or Wool Sorter.** Has worked on cassimeres, cheviots, tricots, kerseys and cloakings. Good references.

1645 **Overseer Weaving.** Age 30; married, American. Has worked in weave room since he was 17 years old as weaver, fixer and secondhand of weaving, except for a short time was traveling salesman. Has worked on ladies' dress goods, men's fine worsted suitings, overcoatings, cloakings, etc., on Crompton & Knowles and Jacquard looms. Excellent references.

1413 **Boss Weaver or Designer.** American; age 49. Has worked on beavers, kerseys, dress goods, cassimeres and all kinds of men's wear. Is also a good loom fixer.

1712 **Second-Hand or Overseer of Weaving.** Age 29; American; single. Has some knowledge of designing. Has worked on fancy worsteds, cassimeres and cheviots. Wants $2.50 per day to start with. Is familiar with Crompton & Knowles machines.

1688 **Overseer of Weaving** in large mill, designer in small mill, or assistant designer in a large mill. Age 38; German; single. Has worked on beavers, chinchillas, fine cassimeres, fine fancy worsteds, ladies' dress goods, army goods, union cassimeres and other classes of goods. Strictly temperate and industrious.

COTTON WEAVERS.

1681 **Overseer or Secondhand of Cotton Weaving.** Has had long experience as loom fixer, secondhand and overseer, and can furnish excellent references. Has also had charge of cloth hall and drawing departments. With one mill was 15 years.

1687 **Overseer of Weaving.** Age 30; Scotch; married. Has worked on taffetas, grogran, satins, serges and grenadines, all kinds of plain and fancy cottons and lenos. Is familiar with Crompton & Knowles and Whitin looms. Wants $4 per day.

1668 **Overseer of Weaving.** Age 41; English; married. Has had large experience as loom fixer and secondhand of weaving, and is competent to take an overseer's job. Has worked on shirtings, sheetings, sateens, fancy lenos, and all grades of fine goods all the way from 2 to 2⅝ harness.

1652 **Overseer Cotton Weaving.** Worked on about all kinds of cotton goods. Age 41, American, married. At present employed in the South, but wants to change for a healthier locality. Refers to present and past employers.

1708 **Overseer of Weaving.** Has had 15 years' experience on 12 different kinds of looms and most all kinds of cotton goods. Has worked in some of the largest mills in the South.

1738 **Overseer of Weaving. Drawing-in, Warping.** Slashing and all preparations. 14 years' experience in colored mill in Manchester, Eng., and two years in this country. Age 37; English; married. Has worked on sateens, drills, ress goods, zephyrs, turkish towels, and d an pick out own pattern for weaving and d rawing-in. Understands the different makes of looms. Wants $3.00 per day.

KNITTERS.

1084 **Overseer of Knitting and Finishing.** Age 33; married. Has just resigned position in the South on account of climate, and is ready to take place at once. Can furnish best of references.

598 **Boss Knitter or Supt.** Age 48; married. Is thoroughly familiar with the manufacture of all classes of seamless hosiery, and can take any position at short notice.

1694 **Asst. Supt.** or foreman of finishing room. Age 30; married; American. Large experience in first class mills, and excellent references. Thoroughly understands the manufacture of children's, men's and ladies' flat and fleeced lined goods and underwear. Can repair all kinds of sewing machines and can take position at once.

1657 **Foreman Seamless Hosiery.** Age 39; American, married. At present employed, but can take a position at short notice. Has worked on cotton and woolen hosiery. Wants $4.00 per day.

1182 **Knitting Mill Supt.** A practical man, having had charge of each and every department in mill before becoming supt. Can furnish references as to character and ability. Wants to become associated with a reliable firm. Would take an interest in stock company starting a new mill. Is familiar with all makes of machinery and all classes of knit goods. Age 40; American; married.

DYERS.

1693 **Dyer.** English, of 30 years' experience on wool, fine worsted yarns, piece dyes, felt cloths, carpet yarns. Understands all the different kinds of indigo vats. Never yet been asked to show recommendations, never before being out of a position, only voluntarily. Would be willing to start in a small place and help to build it up. Understands making soap from all kinds of stock.

1702 **Dyer** or secondhand in hosiery or cloth mill. Age 26; American; married. Nine years' experience. Has worked on hosiery, wool, shoddy and mixed stock. Will work for moderate salary, and can take a position at once. Refers to past employers.

1704 **Boss Dyer.** Age 36; English; single. Is familiar with dyeing cotton yarn and warp both for bleaching, fulling and other purposes. Has dyed for the best firms in England, also for export work.

1714 **Cotton Yarn Dyer.** Age 36; Scotch; married. Has had 15 years' experience on fast shades. Wants $4.00 to start.

1505 **Boss Dyer** on all classes of wool, woolen and worsted yarns, cotton warps, indigo, etc. Desires to change to better himself.

1727 **A Young Man** capable in dyeing cotton, wool, silk and mixed goods, testing of aniline colors and chemicals, would like a position with some large concern where he could gain experience in his several branches. Can give best of references as to ability, honesty, etc.

875 **Overseer of Dyeing.** Age 34; American; single. All classes of wool, woolen and worsted yarns, indigo on worsted yarn and piece dyeing. Not at present employed, and can take position at once. Wants $3.00 per day.

DESIGNERS.

1635 **Designer** on colored cotton dress goods, and shirtings, and fancy worsted dress goods, piece dye, jacquard work in cotton, silk filling, also lappets. Would not consider position paying less than $1200 a year. Is at present employed in one of the leading mills, making fancy cotton, and is an especially bright young man. Early training in Scotland. Has been in this country about four years

1621 **Designer or Assistant Supt.** on men's wear worsteds, cotton worsteds, overcoatings, cassimeres. High and low stock. Has been designer in several first-class mills. Age 34; married.

1672 **Designer, Overseer of Weaving,** or assistant supt. Age 26; English; single. Has worked in various mills in England and this country. Holds first honors diploma for weaving and designing (London City Guilds). Fancy worsteds, dress goods, colored and fancy cotton goods.

1599 **Assistant Designer.** A young man who is studying woolen and worsted designing would like an opportunity to get practical experience, and will accept very small wages. Has worked in mill for two years as weaver on Crompton & Knowles looms. Excellent references as to character.

1591 **Designer** on fancy worsteds, cotton worsteds, fancy cassimeres, tweeds, fancy back overcoatings, etc. Experience in first-class N. E. mills. Age 30. At present employed, but can accept position at once.

FINISHERS.

1526 **Foreman of Finishing Room,** Folding Packing, etc. Age 45; married; English. Has worked on white and colored goods and prints. Is acquainted with every kind of machinery used in his business. Has worked 11 years in this country. Can give good references.

1351 **Boss Woolen and Worsted Finisher** is looking for a position paying $3.50 or more. Age 31; Has worked on all classes of woolen and worsted goods. Can furnish excellent references.

1658 **Overseer Woolen Finishing** Age 35; married. A number of years' experience as overseer in first-class N. E. mills. Worked principally on kerseys, meltons, unions and cassimeres, and is familiar with Curtis & Marble, Parks & Woolson and Cleveland machines. First-class references.

1716 **Finisher.** Age 29; English; married. Has worked as wet finisher, shearer, gigger, second-hand and overseer. Prefers a mill making cassimeres, worsteds, dress goods and face finished goods. A high grade of goods. Is familiar with all kinds of American and English finishing machinery, and can keep same in the best of repairs. Prefers Eastern States. Can take position at one week's notice. Best of references.

1692 **Cotton Finisher and Corduroy** Cutter. Age 31; English; married. Large experience in England and in this country. All classes of corduroys and velvets, cutting, etc., singeing and finishing of cords. Can furnish excellent references.

1729 **Overseer of Finishing.** Age 46 28 years' experience as overseer on all kinds of woolen and union goods Thoroughly posted on finishing low to medium grade of wool warp and cotton warp fancy cassimeres, overcoatings, cloakings, worsted suitings, also steam finished goods. Good references from present employers.

MISCELLANEOUS.

1731 **Young Man of 32 desires to go** to Japan. Is temperate. Been twenty years in cotton mill, and has had experience on many kinds of looms, including Draper. Has best of references. Holding a good position in mill now.

1721 **Asst. Supt. or Designer.** Age 27; American; single. Has worked on all classes of colored cotton goods, plain and fancy, and gray goods. Wants $1200 per year, and can take position immediately.

1723 **Dresser Tender.** Age 42; married. 15 years in a mill as overseer. Is familiar with all makes of machinery. Can take place at once.

1715 **Second-Hand in Cone Winding** or Spooling Room. Age 24; single Has worked on all kinds of White and colored yarns from 4 to 60. Is familiar with Foster, Broadbent and George W. Payne machinery.

1583 **Cloth Room Overseer.** A young man having good experience as overseer in plain and fancy mills desires to change. Has worked on nearly all classes of cotton goods, and is recommended as a first-class figurer and good manager of help. Can take charge of cloth department and shipping where both positions are combined, or would accept position as office assistant. American; married.

1711 **Mill Engineer and Draughtsman.** American; married. Would take up other responsible duties in connection with engineering work. References of the highest character, and salary expected quite reasonable.

1713 **Foreman of Picker Room, or** Painter for some mill and weaver in winter or any other winter work. Wants employment year around. Is an all around man in woolen mill. Has worked on beavers, blankets and fancy dress goods. Wants $2 per day to start.

1726 **Superintendent** broad silks from time of leaving weave room till ready for consumer, piece dye cotton and silk mixtures included, or will accept overseership in any department connected with above. 35 years old; American; married. Is familiar with most all machinery used in this branch.

1685 **Boss Dresser or Assistant Designer.** Has taken a thorough course in designing, and is well up in calculations and in the making of fancy men's wear goods of all kinds. Has worked in Scotland and three years in this country. His knowledge of yarn calculations and practical experience as dresser tender makes him well fitted to fill a position as boss dresser and to run a room in an up to date and efficient manner, or to fill a position as designer or assistant.

1695 A young man would like to obtain a position in some Southern cotton mill as assistant supt., or some such position, where he would have an opportunity to learn the business thoroughly. Has theoretical and some practical knowledge.

1639 **Silk Supt. or Boss Weaver.** Experience covers ribbons, piece goods, velvets, jacquard, plain and plaids. Has had practical experience as loom fixer, designer and overseer. Early training in Germany and later in some of the best silk mills in this country. Also understands manufacture of corduroy.

1735 **Boss Calenderman.** Age 35; English. Is familiar with all kinds of machinery used in bleachery, and has worked on sateens, silesia, cambric, shirtings, sheetings, etc. Wants $3.00 a day. Can furnish references.

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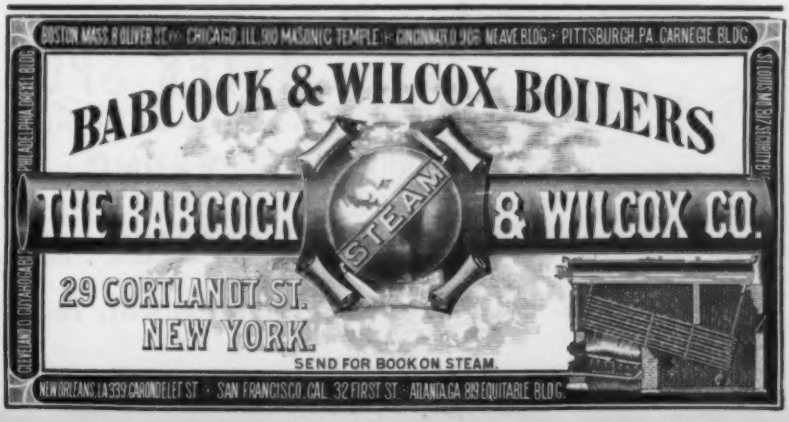
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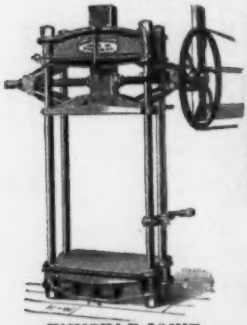

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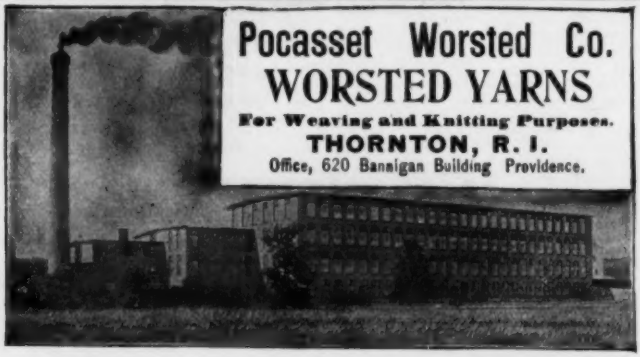

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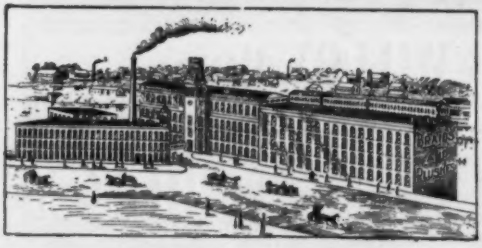

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Mohair and Worsted

YARNS.

Mohair Plushes,

Worsted and Cotton Braids.

D. COFF & SONS, Pawtucket, R. I.

— ESTABLISHED 1861. —

YARN DEPARTMENT.

Eastern Yarn Market.

Cotton Yarn: Spinners continue busy on old orders. So far as 2 ply ring spun yarn is concerned, the demand is falling off, and the price is on the decline in consequence.

In one year the price for this yarn has increased 100%. The cause of the advance and decline is found not only in the price of cotton, but in the rise and fall of cotton worsted cloth; buyers of this cloth over-purchased, and now find the consuming public will not have the suits made from the cotton cloth. The clothiers have many suits which cannot be sold, and much cloth which they dare not make up. This has been an important factor in the present decline in this yarn.

Many of the numbers, which are staple, were held at high prices, and the large mills, rather than pay the prices previously asked, imported yarn from England at several cents per pound less than some American holders would sell for.

The cheaper grades of cotton yarn being used for fleece lined backing of plush shirts are not in so great demand, as many knitters of these garments are running merino and woolen back, thus making a very desirable garment.

Hosiery continues to call for large quantities of yarn. It is believed that hosiery is to be made almost entirely out of cotton, as worsted and wool hosiery is being less used each year. Contracts have been placed sparingly, as manufacturers are looking for lower prices. The yarns used are mostly 1/10s to 1/12s, and much southern yarn is used. Fine colored cotton yarn in 1/26s to 1/34s continues to sell in good quantities, mostly for the face of plush garments. Manufacturers of ribbed underwear are busy, but are placing contracts cautiously. Combed Egyptian continues to range at a higher price than the knitters can pay and get a profit out of garments. This high priced yarn will undoubtedly enable France to export much to this country. The profits of the spinners must have been large, but there is undoubtedly a tendency toward lower prices.

Worsted Yarn: Spinners are still busy, although some are beginning to run out of orders, and weavers, who expect to bear the market, are talking prices which are from 5 to 10 cents per pound under spinners ideas. Many weavers have orders for ½ blood yarn, which were booked as far back as last September, and have not as yet given spinning instructions. This applies to all fine yarn business. The Rockville Mills using 2/40s fine Australian are slack, and are believed to have much yarn on hand. The yarn that is being most used today is 1/4 and 3/8 blood quality, and these yarns are being firmly held, and a good business is doing. That is really about the only class of yarn, in which there is much business. The trade requiring fine yarns are waiting for lower prices. We hear from reliable sources, that one large worsted mill has 35 combs out of 70 combs stopped. The trouble with the manufacturing business is the great amount of cancellations. One manufacturer told writer, that on one line of his goods, where he had sold 2500 pieces, 1500 pieces were canceled. The manufacturers last year secured orders and covered themselves with stocks. When the cancellations came, manufacturers were left with large stocks of wool and worsted yarn. We hear from all sides, that the best selling cloth has been made from 1/4 to 3/8 blood stock, and the finer grades have been left alone almost entirely. Woolen yarns have been very largely used this season. There has been a great use of substitutes, and has therefore decreased the use of worsted yarn. Great qvantities of cotton worsted

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Frank E. Patterson, Prest. Oscar W. Wood,

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In numbers from 6s to 26s.

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W. Warren Thread Works,

SPOOL COTTON

on 100 to 12,000 yd. Spools or Tubes.

A Specialty of Thread for Manufacturers Use

on Spools, Tubes or Bobbins.

Also Seaming and Hosiery Yarns

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Our bleaching and dyeing facilities are new and unsurpassed for prompt and neat work. Correspondence solicited.

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The Best is the Cheapest.

It is BETTER and CHEAPER to wind yarn by the "Universal" system before shipment from the mill, thus insuring perfect delivery to knitting machines without rewinding.

UNIVERSAL WINDING CO.,

F. H. BISHOP, Manager.

226 Devonshire St., - Boston, Mass.

goods have been made, where the percentage of worsted yarn is as small as 1%, and some of these goods have no worsted in them at all. Many of the worsted spinners own large stocks of wool, which show a loss on today's market. Many could have sold at a profit in December, but refused to do so, anticipating greater profits. The finest class of cloth is hardest to move. 2/40s fine Australian yarn at the present prices is almost unsalable, even with prices much reduced. The light weight season is on, and the weavers and spinners know that more worsted will be used in light weight, and that the spinners will have some good business. Spinners feel very badly at the turn prices have taken, and think that, by keeping off the market, and not urging orders a further decline will be averted, spinners are selling yarn on old contracts at 5 to 10 cents per pound higher than they can get out of new orders. French spun yarn continues in good demand, mostly on orders placed early in last year. Some of the knitters find that they now have no use for yarn purchased, and are trying to unload at best price possible. The new French spinning mills are pushing for business. We note that there have been orders placed recently by knitters, and there is a feeling that, when prices seem to have reached a firm level, a good business will result. The present stagnation is due almost wholly to cancellations and overbuying. The combers are not very busy, coarse grades are the only kind selling at this time.

Woolen Yarn: Spinners continue very busy with orders which will last them well into the year. The demand comes from all classes of manufacturers, knitters, weavers, and hosiery manufacturers. This machinery has not been so busy in years. Many of the weavers of worsteds are substituting woolen yarn for worsted yarn, to get the cost of cloth at a lower level. The knitters are buying yarn from hand to mouth, trying to get prices

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YARNS 40s and above. AND
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SPECIALTY—FIRE HOSE CORD and YARNS put up on tubes wound on Universal System.

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In gray and all colors, single or in any twist.

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In Cotton, Mercirized Cotton, Silk and Worsted, in various Patterns, Colors and Twists.

We are always pleased to assist our patrons of the Woolen Goods manufacture in special pattern warps for samples.

We use a uniform grade of long stapled cotton in all our manufacture.

lower each time. The orders for knitted goods are holding fairly well, so that the knitters who have not large stocks can take advantage of the market, and make a good average on the season's purchases. Much yarn is being sold for the backing of fleece lined cotton garments, and many yarns are being used for the backing of cloakings and over-coatings. The yarns sold to the weavers are largely cheap shoddy yarns which range from 1½ to 2 run. The knitters are using largely merino yarn, and the hosiery trade are on the finer woolen yarn, also on yarns for French flannels. Many of the knitters will use large quantities of thread waste the coming season, as this article is getting within the reach of knitters. The London wool market has closed with the withdrawals amounting to over 167,000 bales which is more than half the wool offered. The next series will open July 3d, the closing was not well attended. We note that in Europe the spinners are not using merino wool on account of its high cost, and are running mostly on cross bred stocks.

The wool receipts in Boston from the West are lighter at present than has been the case for years.

The West is holding for higher prices, and the buyers and sellers are about 3 cents per pound apart. It is naturally asked, what are the growers basing their ideas on as to price? The answer is easy enough. The Boston dealers in November contracted for about 7,000,000 pounds of wool on the sheeps' back. This wool could be purchased today at 3 cents per pound less money. The result of this buying has been that all the other growers want to get as much money for their wool as did their neighbors, who sold before the wool had been grown.

The other reason is that the banks in the west have plenty of money, and are advancing it freely to the growers, as these banks cannot make anything out of their deposits and surplus, unless it is loaned, and are quite willing to loan it on wool, until it has declined to the danger line of their loan, when they will be anxious to have the loan paid up. That is why the western market holds to the present prices. Unless the cloth market improves or a shortage in supply develops, neither of which seems probable now, the growers will finally be forced to sell at the prices the dealers think reasonable, as the growers cannot eat the wool, and will be forced to accept prices the trade warrants. The dealer is a very careful man on today's

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Cotton Yarns in Cops, Cones and Skeins; on Beams or Spools, Single and Twisted. Cable Cords and Twines.
PAWTUCKET, - R. I.

NEW ENGLAND THREAD CO.,

MANUFACTURERS OF

SPOOL COTTON IN NUMBERS FROM 8 to 100,

In All Grades and Lengths on Spools and Tubes.

Seaming Yarns on Cones; Polished Threads and Yarns on Bobbins.

DYEING AND BLEACHING of All Kinds of Yarns and Narrow Fabric a Specialty. Best of Spring Water for Bleaching.

PAWTUCKET, R. I.

Knitting and Weaving Yarns

Cones, Cops, Warps, Skeins,
Single, Double, Three-ply, etc.
Peeler, Egyptian, Mixed Colors.
Large Assortment.

EDWARD S. HYDE, 223 and 225 Chestnut Street, **Philadelphia, Pa.**

GREENE & DANIELS MFG. CO.,

COMBED, CARDED AND GASSED

Yarns, Threads, Twines and Chain Warps,

Colored and Bleached Yarns Furnished in any manner desired by the trade. **PAWTUCKET, R.I.**

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WINDSOR LOCKS, CONN.

Manufacturers of

Mercerized Cotton Yarns. GIVES THE HIGH SILK-LIKE LUSTRE IN KNIT GOODS AND WOVEN FABRICS

Novelty Yarns. BOUCLE, BOURETTE AND SPIRALS, IN COTTON, WOOL, WORSTED, MOHAIR AND SILK.

Cotton Warps. ON BEAMS, JACK SPOOLS AND TUBES. IN FANCY TWIST COLORS AND PRINTED.

PLATT BROS.,

Woolen Yarns.

Main and Wa'nut Sts., - - Manayunk, Pa.

Correspondence solicited.

market, as his last boom has busted, and has left him with considerable high priced wool on his hands. The wool trade has lost money.

Philadelphia Cotton Yarn Market.

The past month has developed rather an unexpected weakness in the present crop of cotton. This weakness has been increased by the failure of a large speculative house. The weakness of the market has extended to yarns, and buyers are placing business very sparingly, which tends to make the market still easier.

The greatest declines have occurred on such yarns as were put up the highest, notably, 2/16s, 2/14s, 2/30s, 2/26s, 2/24s. The volume of yarn being used, however, is very large and many mills are sold up for some months ahead, especially those mills making knitting yarn. There is a considerable range of prices, dictated partly by the quality of the yarn, and partly by the condition of the spinner, regarding orders. Some concessions are probably being made for orders commencing on the new crop of cotton, say Oct. 1st. We understand some orders have been offered, already, for this date. We quote the following prices, for present delivery, which are shaded by some spinners.

Southern Cones:—

5s and 6s	15¼ to 16
7s and 8s	15½ to 16
10s	16 to 17
12s	17 to 17½
14s	17 to 18
16s	17½ to 18¾
18s	19 to 19½
20s	19½ to 20½
22s	20 to 21
24s	21 to 22
26s	22 to 23
30s	24 to 25

New England list prices, Cones:—

10s	18¾
12s	19¼
14s	19¾
16s	20¼
20s	22½
24s	24⅝
30s	27½

Silver and jaeger yarn, 2c. per pound higher.

Mock Egyptian, 3 to 4c. per pound higher.

Southern Skein:—

8/1	14½ to 15
10s	15 to 15½
12s	15 to 15½

WAVERLY WORSTED CO.
SPINNERS OF
WORSTED YARNS
FOR WEAVING AND KNITTING.
Main St. & Green Lane, Manayunk, Philadelphia.

DAVIDSON & BROOKE,
ORIANNA BLEACH WORKS,
Bleachers
Of Turkish Towels, Cotton Yarns, Underwear, Tapes and Hosiery.
2562-62-64 No. 3rd St., PHILA., PA.

EICHMANN & STERNBERG
530 Broadway cor. Spring St., NEW YORK.
Mercerized, Turkey Red, Gassed } Cotton Yarns.
Jacquard and Harness Twines.

YARNS
SOLIS : : BOSTON.
179 Devonshire Street.
ANDREW J. SOLIS, Jr. & CO.

MONUMENT MILLS,
Manufacturers of
White, Colored, Fancy and Double and Twist, COTTON WARPS
HOUSATONIC, MASS. 4s to 60s.

HOWLAND CROFT, SONS & CO.

LINDEN WORSTED MILLS.

Fine Worsted Yarns

OFFICE AND MILLS:

Broadway and Jefferson Ave., Camden, N. J.

Represented by FIRTH BROADHEAD,
937 Banigan Building, Providence, R. I.

ALLEGHENY WORSTED MILLS,

Thomas Wolstenholme, Sons & Co., MANFRS. OF

Worsted YARNS,

ALL NUMBERS SINGLE AND TWO-PLY,

Sell Direct,

on Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural & Fancy Mixes.

Office and Mills: Frankford Ave. and Westmoreland St., Phila., Pa.

CRANSTON WORSTED MILLS.

Worsted and Mohair Yarns—white or colors, in skeins, on spools, cones, or shuttle bobbins.

NOVELTY YARNS—of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making Yarns **only.**

CENAPPED YARNS of all kinds. Doup Yarns. Harness Yarns. For Braids, etc.

...Dyers of Yarn and Slubbing...

BRISTOL, R. I.

George Campbell & Co.

Worsted Spinners.

Yarns, both French System and Bradford.

Knitting Yarns in all Grades and Mixes.
All Numbers to 60s.

21ST STREET AND WASHINGTON AVENUE, PHILADELPHIA.

MALCOLM MILLS CO.,

MANUFACTURERS OF

Novelty Yarns, Silk Noil Yarns, in Fast Colors AND White.

Mills, Frankford, Pa. Office, 229 CHESTNUT ST., PHILA.

14s	15½ to 16
16s	16 to 16½
20s	17 to 17½
22s	17½ to 18
26s	18 to 18½

Single warps:—

14s to 16s	16
18s to 20s	16½ to 17
26s	18

Skein:—

8/3	14 to 14½
12/2	15 to 15½
30/2	23 to 23½
40/2	34 to 36
20/2	18 to 18½
14/2	15¾ to 16

Warps, (two ply):—

14s	16 to 16½
16s	17½ to 18
20s	18 to 19
30s	23 to 24
40/2	35 to 38

Southern Yarn Schedule.

At a special meeting of the board of governors of the Cotton Spinners' Association at Charlotte, N. C., on May 11th, the following schedule of prices was adopted:—

Single skein:—

8	15½
10	16
12	16½
14	17
16	17½
18	18
20	18½
22	19½
26	20½

Single warp:—

8	16
10	16½
12	17
14	17½
16	18
18	18½
20	19
24	21
25	21½

Two and three-ply skeins:—

2, 2 and 4-ply 8 skeins	16
2, 3 and 4-ply 10 skeins	16½
2, 3 and 4-ply 12 skeins	17
2 and 3-ply 14 skeins	18
2 and 3, 16 skeins	12½
2 and 3, 18 skeins	19
2 and 3, 20 skeins	21
2 and 3, 22 skeins	22
2 and 3, 24 skeins	25
2 and 3, 26 skeins	24

SILK NOILS AND SILK NOIL YARNS
IN WHITE AND COLORS.
MOHAIR LOOPS, KNOTS, AND FANCY YARNS FOR DRESS GOODS AND CLOAKINGS.
A. T. SKERRY & CO., 47 LEONARD ST., NEW YORK.

Weaving and Knitting Yarns.
Sanitary and Fancy Mixes
Wolstenholme & Clark,
Worsted and Worsted Merino Yarns.
FRENCH SYSTEM.
Mills, Baker and Mallory Sts.
No. Manayunk, Philadelphia, Pa.

C. J. LITTLEWOOD & SONS, Ltd.
ALBION
DYE and BLEACH WORKS,
MANAYUNK, PA.
DYERS of Cotton, Cotton Yarns, Wool and Raw Stock Generally. BLEACHERS of Cotton and Cotton Yarn.
CITY OFFICE: 132 Chestnut Street. PHILADELPHIA.
Telephone Connection, MAIN OFFICE AT THE WORKS.

CHENEY BROTHERS,

SILK MANUFACTURERS.

ALL KINDS OF

Knitting Silks, Ribbons AND Piece Silks,

USED FOR TRIMMING KNIT GOODS.

TRAMS, ORGANZINES and SPUN SILKS, in the Hank, or on Spools or Cones, for Manufacturers' Use. Silk for Special Purposes Made to Order.

MILLS: South Manchester and Hartford, Conn.

SALESROOMS: 477, 479 and 481 Broome Street, NEW YORK.
929 Chestnut St., PHILADELPHIA.
79 Chauncy Street, BOSTON.
186 Franklin Street, CHICAGO.

2 and 3, 30 skeins	26
2 and 3, 40 skeins	36
2-ply warp	8
2-ply	16½
10, 2-ply	17½
12, 2 ply	18
14, 2-ply	19
16, 2 ply	19½
18, 2-ply	20
20, 2-ply	22
22, 2-ply	23
24, 2-ply	25
26, 2-ply	25½
30, 2-ply	26½
40, 2-ply	38

Standard twist and soft yarn, the usual advance.

Patents.

(Concluded from page 983.)

Loom, Machine for Twisting Warp Threads In. 648,738. Albert Goss, Lake View, N. J.

Loom, Harness Operating Mechanism for. 650,813. Fred Lacey, Valleyfield, Quebec.

Loom, Shedding Mechanism for. 650,607. Thos. Morrison, Williamsport, Pa.

Loom, Shedding Mechanism for. 650,737. Ernest Tebbs, Philadelphia, Pa., assignor to Draper Co., Portland, Me., and Hopedale, Mass.

Loom Shuttle. 650,562. T. W. Millward, Levenshulme, Eng.

Loom, Take-up Mechanism for. 650,717. George Goodline, Paterson, N. J., assignor, by mesne assignments, to Crompton and Knowles Loom Works, Worcester, Mass.

Loom, Change-Retarding Device for Weft Replenishing. 650,684. W. N. Kimball, Somersworth, N. H.

Loom. 648,986. Jonas Northrop, Hopedale, Mass., assignor to Draper Co., same place, and Portland, Me.

Loom, Filling, Changing Mechanism for. 649,403. Alvah W. Clement, Hopedale, Mass., assignor to the Draper Co., same place, and Portland, Me.

Loom, Pile Spreader for. 649,083. Thos. J. Stearns, Boston, Mass.

Loom Shuttle. 649,141. Harold G. Rawlings, Worcester, Mass.

Loom, Take-Up Stop-Motion for. 649,203. Thos. Finn and Wm. S. Brodie, No. Andover, Mass.

Loom, Warp Stop-Motion for. 649,419. Wm. E. Allen, Salem, Mass., assignor to Draper Co., Portland, Me., and Hopedale, Mass.

Loom, Warp Stop-Motion for. 649,242. H. I. Harriman, New York City.

Loom. 650,165. Wm. Brimfield, Blue Anchor, N. J.

Loom. 649,920. Harry Ellis, Wallasey, Eng.

Loom. 650,140. Walter Todd, Sloatsburg, N. Y., assignor of five-eighths to Nathan Hirsch, New York City.

WILLIAM RYLE & CO.,

DEALERS IN

Domestic Thrown Silk of every description. Fine Pure Dye Silks for the woolen trade a specialty. Foreign and domestic

SPUN SILK YARNS AND NOILS

Importers of European and Asiatic Raw Silk.

64 Howard St., cor. Mercer St., - NEW YORK.

THE SECRET of our popularity is no secret to our customers Experience has taught them that we give them better work and better service than they can get elsewhere.

T. BROPHY'S SONS, Jasper Street above Clearfield Street, PHILADELPHIA.

Dyers of All Kinds of Yarn and Cotton Warps.

EUGENE F. FREUND

New York

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Designer of

COTTON, WOOLEN AND SILK DRESS GOODS, TIE SILKS, RIBBONS, WARP AND SURFACE PRINTS, UPHOLSTERY, DRAPERY, CARPETS, DAMASK, COUNTERPANES, CURTAINS, CHENILLE, Etc. . . . . .

Loom, Shedding Mechanism for. 650,280. Hermann Staubli, Horgan, Switzerland.

Loom Picker. 649,698. M. M. Lahue, Lowell, Mass.

Machinery Coupling, Textile. 650,450. Joseph Brook, Bradford, and Thos. Leach, Rochdale, Eng.

Mercerizing Machine. 650,442. F. C. W. Stelter, New York City.

Skein-Holder, Silk. 650,630. Kate W. Chamberlain, Milton, N. J.

Skeins, Device for Holding Silk, etc., 649,495. Stasia Sweeney, Springfield, Mass.

Spinning Frame Attachment. 649,397. Robert Burgess, New Bedford, Mass., assignor to Draper Co., Portland, Me. and Hopedale, Mass.

Spinning Frame, Thread Protector for Ring. 649,186. John C. Wall and Michael E. Schedlbauer, Jr., Amsterdam, N. Y.

Spinning Machine Cleaner. 650,515. Severin Mock and Walter H. Jackson, Pawtucket, R. I.; said Jackson assignor to Jackson Patent Shell Roll Co., same place.

Spinning, Twisting and Winding Machine. 650,708. Robt. Dawes, Philadelphia, Pa., assignor of two-thirds to Edmund Dawes, same place, and E. Haskell, Newton, Mass.

Spooling Machine, Knot Finisher and Trimmer. 650,620. Arthur Stafford, Lancaster, Can.

Tentering Machine Fastening Device. 650,385. Chas. J. Gadd, Philadelphia, Pa.

Tentering Machine. 650,202. Robt. E. Smith, Wm. E. Baker and Jacob J. Glaeser, Philadelphia, Pa., assignors to H. W. Butterworth & Sons Co., of Pennsylvania.

Warping Machine. 649,221. Chas. Slingland and Geo. F. Kuett, Paterson, N. J.

Warping and Beaming Machine. 648,692. Wm. C. Keyworth and T. A. Robinson, Paterson, N. J., assignors to the Benj. Eastwood Co., same place.

Weaving Rugs, etc., Strand or Rope for. 650,512. C. E. Mead, Duluth, Minn.

Winding and Measuring Machine for Ribbon. 649,381. Brinton D. Wight, Napinka, Can.

Winding Machine, Fabric. 649,380. Brinton D. Wight, Napinka, Can.

Winding Machine, Automatic Threading Device for. 649,088. S. W. Wardwell, Jr., Providence, R. I., assignor to the Universal Winding Co., Portland, Me.

Wool Fat, Treating. 649,454. John Hopkinson, Bradford, Eng.

Wool Washing Machine. 650,727. Wm. McNaught, Rochdale, Eng.

Wool Washing Machine. 650,728. Wm. McNaught and Thos. W. Hawkins, Rochdale, England.

Yarn, Apparatus for the Quantitative Determination of Moisture in. 648,868. Wm. D. Hartshorne, Methuen, Mass.

Pawtucket Dyeing & Bleaching Co., BLEACHERS AND DYERS OF

COTTON YARNS AND STOCKINET.

OFFICE WITH BLODGETT & ORSWELL CO., Manufacturers of Glazed Yarns,
232 FRONT ST., PAWTUCKET, R. I.

DUNCAN & BAILLIE,

COHOES DYE WORKS, NEWCOMB STREET COHOES, N. Y.

Dyers of Raw Cotton, Wool and Knit Goods.

Satisfaction Guaranteed.
Capacity 10,000 lbs. per day. Prompt Deliveries.

The Wm. H. Lorimer's Sons Co.

MERCERIZERS AND DYERS,

DEALERS IN
MERCERIZED COTTON YARNS
All Numbers Up to 140s 2 Ply in
Combed Peelers, Egyptians, &
Sea Islands . . . . .

Ontario & Lawrence Sts.,
Philadelphia, Pa.

Stamps for Cotton, Linen and Knit Goods.

The accompanying cut is a sample of the excellent work done by Mr. A. M. Michael, Broadway, corner State St., Albany, N. Y., in the line of stamps for textile goods.

He manufactures all kinds of rubber, brass and steel stamps for mill use. Manufacturers, who realize the importance of having their manufactured goods done up in neat and attractive shape, will appreciate such goods as Mr. Michael handles.

This cut is from one of his brass stamps for cotton manufacturers, and the attention of manufacturers is called to the workmanship.

Mr. Michael makes a specialty of supplying the knitting trade, and carries a full line of supplies, stamp pads, ink, etc., at reasonable prices.

PROVIDENCE DYE WORKS.

Dyers and Finishers,

COTTON YARNS, Suited for HOSIERY and WEAVING Cotton, Woolen and Worsted DRESS GOODS, Woolen and Worsted Mixed CASSIMERES and CLOAKINGS, also Woolen and Worsted Slubbing, COTTON YARN and WARP DYERS and BLEACHERS.

FIRTH & FOSTER CO.,

OFFICES: Philadelphia, 546 Bourse Building.
New York Office, Silk Exchange, Broadway and Broome St.
WORKS: Taylor, Emerald and Adams St., Kensington, Philadelphia, Pa.

R. GREENWOOD & BAULT,

GLOBE DYE and BLEACH WORKS,

Frankford, Philadelphia, Pa.

Dyers, Bleachers and Mercerizers of Warps and Skein Dyeing.

HOME BLEACH AND DYE WORKS,

PETER B. McMANUS, Proprietor.

Dyers and Bleachers of Cotton Yarns,

PAWTUCKET, R. I.

Preparing for Summer.

The American Moistening Company, Boston, Mass., report a large volume of business for this season, quite natural, however, inasmuch as the benefit to be derived from their system of humidifiers is of great value during the summer months. Orders for this month have been received from the following mills: Magid-Hope Silk Mills, Milford, Mass.; Everett Mills, Lawrence, Mass.; repeat order, Barker Cotton Mills, Mobile, Ala.; Laurel Cotton Mills, Laurel, Miss.; Scottdale Cotton Mills, Ingleside, Ga.; Sibley Mfg. Co., Augusta, Ga.; Stevens Mfg. Co., Fall River, Mass.; Whittenton Cotton Mills, Taunton, Mass.; repeat order, Payne Cotton Mills, Macon, Ga.; Pelham Cotton Mills, Pelham, S. C.; Lancaster Mills, Clinton, Mass.; repeat order, U. S. Cotton Co., Central Falls, R. I.; repeat order, Wm. H. Grundy & Co., Bristol, Pa.; repeat order, Pocasset Mfg. Co., Fall River, Mass.; Forestdale Mfg. Co., Forestdale, R. I.; Jackson Company, Nashua, N. H.; repeat order, Dwight Mfg. Co., Alabama City, Ala.; repeat order, Pemberton Mills, Lawrence, Mass.; repeat order, Walhalla Cotton Mills, Walhalla, S. C.; Nashua Company, Nashua, N. H.

Smethurst Roving and Twist Gear.

Mr. George Smethurst, Maynard, Mass., has advanced the price of his roving gear from $3.00 to $4.00. They are giving satisfaction, wherever used, and are sent on thirty days' trial.

Modern Methods.

The transportation of materials and stock in process from one part of a mill to another is a large item of expense in many of our textile mills. This is especially the case in the older mills which have been enlarged from time to time during a period of many years, and are now so arranged that the stock must be carried back and forth from one process to another.

The illustrations in the circular issued by the Link-Belt Machinery Co. show how well this is being done by their link-belt.

This method can well be applied to advantage in textile mills for carrying raw materials, empty and full bobbins, spools, coal, etc.

The Chace Mills, of Fall River, Mass., finding some of their engines, which have been running for twenty-eight years, to be overloaded, concluded to reinforce them by transmitting power from another engine located 250 feet distant. They installed a rope drive for this purpose, which is now transmitting about 200 H. P. over this distance.

—Regarding economy of air heaters, and the substitution of a blower for a chimney, the late J. C. Hoadley says: "There can be no doubt that the heat to be returned to the furnace would several times exceed that necessary to make the power required to drive the exhausting fan, to the operation of which the final temperature of the gases presents no objection."

FAST COLORS

For Wool, Woolen and Cotton Yarn and Piece Goods Dyeing, and for Calico Printing

ALIZARINE RED, PASTE AND POWDER.

Alizarine Blues, Oranges, Browns, Yellows, Maroon, Gray and Black.
Cœruleine, Galleine, Mythylene Grays.
Thionine Blues, Thionine Indigo, Solid Green and
PATENT BLUES (superseding Extracts of Indigo on account of fastness and color bloom) for Wool and Silk, Benzidine and Primuline Colors, Zinc Dust, Aniline Salts and Oil.

VICTOR KOECHL & CO. 122 HUDSON ST., NEW YORK.

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Boston, Mass., 138 Milk St.; Philadelphia, Pa., 39 N. Front St.; Providence, 45 S. Main St.

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Bleachers, Dyers, Printers and Finishers,

OF ALL KINDS OF FABRICS.

3-4 and 6-4 Woolens and Mixed Cassimeres,

ALSO

Cottons and Linens.

JOHN CAPSTICK & SONS, Montville, N. J.

Freight via D. L. & W. R. R.

New York Office, Lawrence Building, 190 West Broadway.

WM. DUDLEY, Pres. ISAAC H. ROGERS, Treas. JOHN MCPARLAN, Mgr.

PHILADELPHIA LINEN FINISHING COMPANY,

BLEACHERS AND FINISHERS OF LINEN

Towels and Damask, also Turkey Red Damask, Centre Covers, Doylies, Napkins, Carriage Robes, Dusters, etc.

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The STONE & WARE CO.,

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Colors, Dyestuffs and Chemicals.

145 Kinzie Street, CHICAGO. 157 Maiden Lane, NEW YORK. 105 Reed Street, MILWAUKEE.
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Wm. J. Matheson & Co., Ltd.

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MANUFACTURERS OF

DYE STUFFS

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Philadelphia,
Providence,
Charlotte, N.C.,
Montreal, Canada.

FARBENFABRIKEN OF ELBERFELD CO.

40 STONE STREET, NEW YORK.

BOSTON. PHILADELPHIA. CHICAGO.

Alizarine Black-Bayer

(DIAMOND BLACK.)

THE SHARPLESS DYE-WOOD EXTRACT CO.,

OFFICES: 648, 650, 651 The Bourse, PHILADELPHIA.

Warehouse: 22 N. Front St., PHILADELPHIA. Works: CHESTER, PA.

—MANUFACTURERS OF—

DYEWOODS AND EXTRACTS.

LOGWOOD.
FUSTIC.
BARK.
BLACK DYE.
CUTCH.

MOLT BROS.,

MILLBURY, MASS.

—MANUFACTURERS OF—

INDIGO BLUE DYE

Wool Scouring, Raw Stock in Piece.
Dyeing all shades. Unions and shades.

All work done by experienced workmen and guaranteed to give satisfaction.

OAKES MANUFACTURING CO.,

Hematine, Extracts of Dyewoods, Chemicals.

New York. Boston. Philadelphia. Atlanta.

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ANILINE AND ALIZARINE COLORS.

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Extracts of Indigo, Indigo Carmine.
Indigotine, Refined and Reduced Indigo.
Indigo Substitute.
Bisulphite of Soda.
Peroxyde of Hydrogen.
Alizarine Assistant 30 & 50%
Soaps.

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Fast Black.
Acetate of Chrome.
Cutch and Gambier Extracts.
Colorless Sumac. — Sucrosine.
Specialties:
French Dressings and Finishings
for Silk, Wool and Cotton.

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Importer and Manufacturer,
106 AND 112 BROAD STREET,
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ALIZARINES

Special Colors for
COTTON, WOOL, SILK AND MIXED GOODS.

ANILINES, EXTRACT CUTCH, GAMBIER, SUMAC, LOGWOOD, Etc.
SCOURING COMPOUNDS, COTTON SOFTENERS, MILL SUPPLIES.

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104 and 106 MURRAY STREET, NEW YORK.

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18 Pryor St., Atlanta, Ga.

Aniline Colors,
Dyewood Extracts,
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FAST COLORS for wool dyeing, one dip cotton colors, novelties and specialties for calico printing.

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Chemicals

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ST. DENIS BLACK

PATENTED,

FOR COTTON.

Non-injurious to the fibre,
No acid necessary in dyeing.
Will not bleed.

Applicable to Warps, Skein Yarn, Piece Goods, New Stock and Hosiery.

Fast to Air, Acid, Light, Milling and Cross-dyeing.

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—SOLD BY—

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Dyewood Extracts and Liquors,

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O. S. JANNEY & CO.,

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Besides the Natural Dye Stuffs, Chemicals, Etc., we Carry a Full Line of Aniline Colors.

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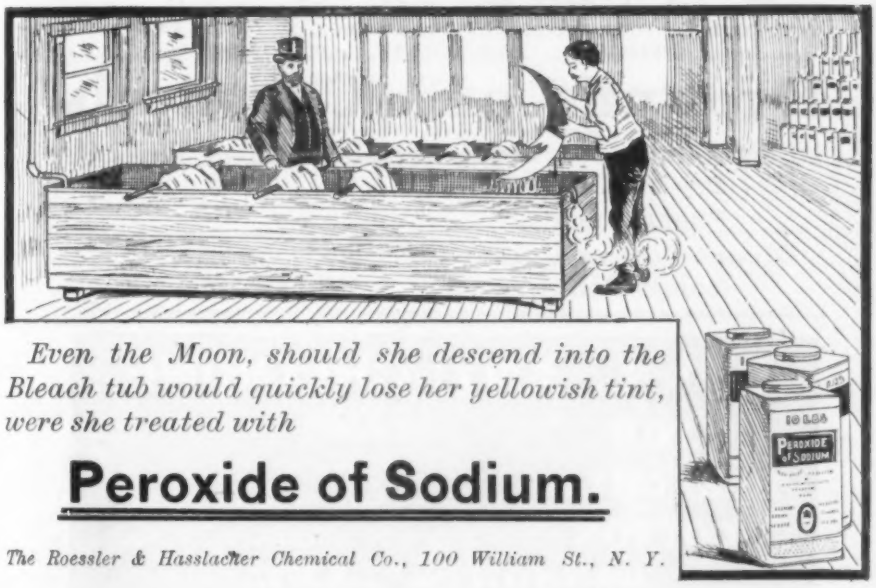
Rhodamines, Patented.

Alizarine Blacks, Patented.



Even the Moon, should she descend into the Bleach tub would quickly lose her yellowish tint, were she treated with

Peroxide of Sodium.

The Roessler & Hasslacher Chemical Co., 100 William St., N. Y.

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Fast Colors for Wool.
Dry Alizarine.
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FOR BLEACHING COTTON

No Acid,
No Soap,
No Trouble,
No Tender Yarn.

BOSSON & LANE,
Sole Manufacturers. BOSTON.

Established 1834. H. G. JOHNSON, Proprietor.

Wm. G. Johnson Co.

Manufacturers of

DYEWOODS

Logwood Extracts,
Ground and Bolted Camwoods
And other Fancy Woods.

All Goods Warranted Uniform.

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DILLON & CO., 20 Cedar St., New York, SOLE AGENTS FOR THE UNITED STATES AND CANADA.

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Dyestuffs and Chemicals.

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Dyewoods and Extracts.

Phthalein, Alizarine and other fast colors for Cotton, Wool and Silk. Shades matched and full particulars sent on application.

Nubia One Dip Fast Black for Woolens, Lion Ammonia Wool Scourer, etc. Agent for Stutz & Co,, London, W. F. Stutz, Calcutta and Williams & Co , Madras.

American Aniline Company,

Importers and Manufacturers of

ANILINE COLORS, CHEMICALS and EXTRACTS

163 North Front Street, PHILADELPHIA.

ESTABLISHED 1865.

ANCHOR COLOR MANUF'NG CO.,

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ANILINES, DYESTUFFS and CHEMICALS.

Direct Colors for Cotton, Wool and Mixed Goods.

New Belgium Blue. . . .

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Copper Printing Rollers, Singe Plates and Sheets.

OUR GUARANTEE: { Superior Quality. Prompt Shipments.

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Woolen Drying and Finishing Machinery,

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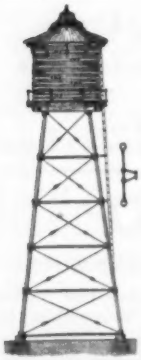

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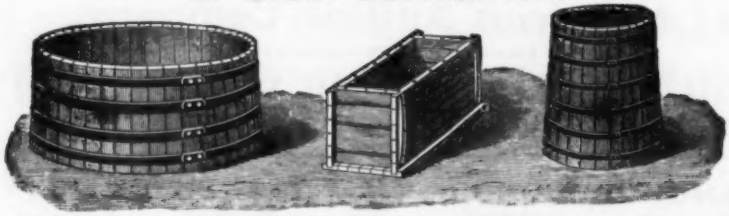

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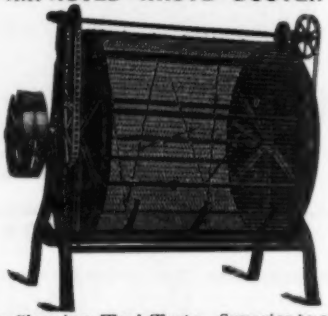

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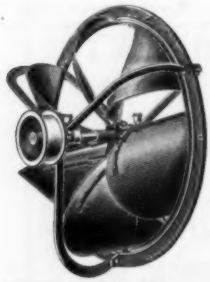

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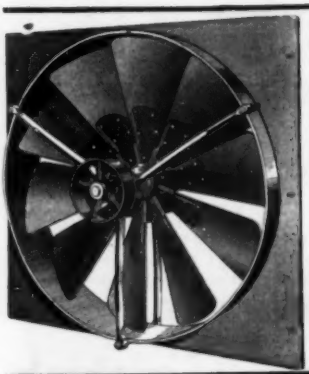

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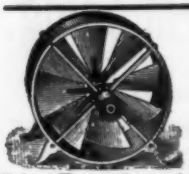

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For Four, Six and Eight Strings of Goods.

Power transmitted by means of a Friction Pulley.
No Shifting of Belt to start and stop the machine.
Less power required than for any other Washer of equal capacity.
All Main Bearings are adjustable. All Bearings are on the outside of frames.
No dripping of Oil on the Goods, or in the Wash Box.

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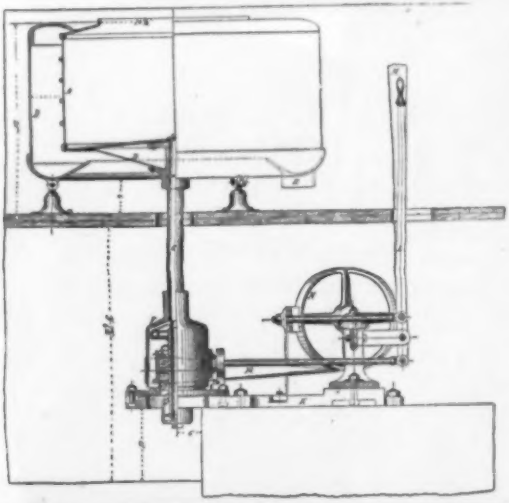

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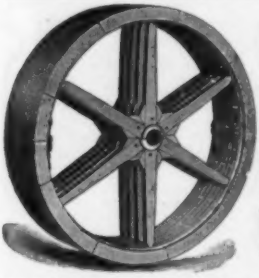

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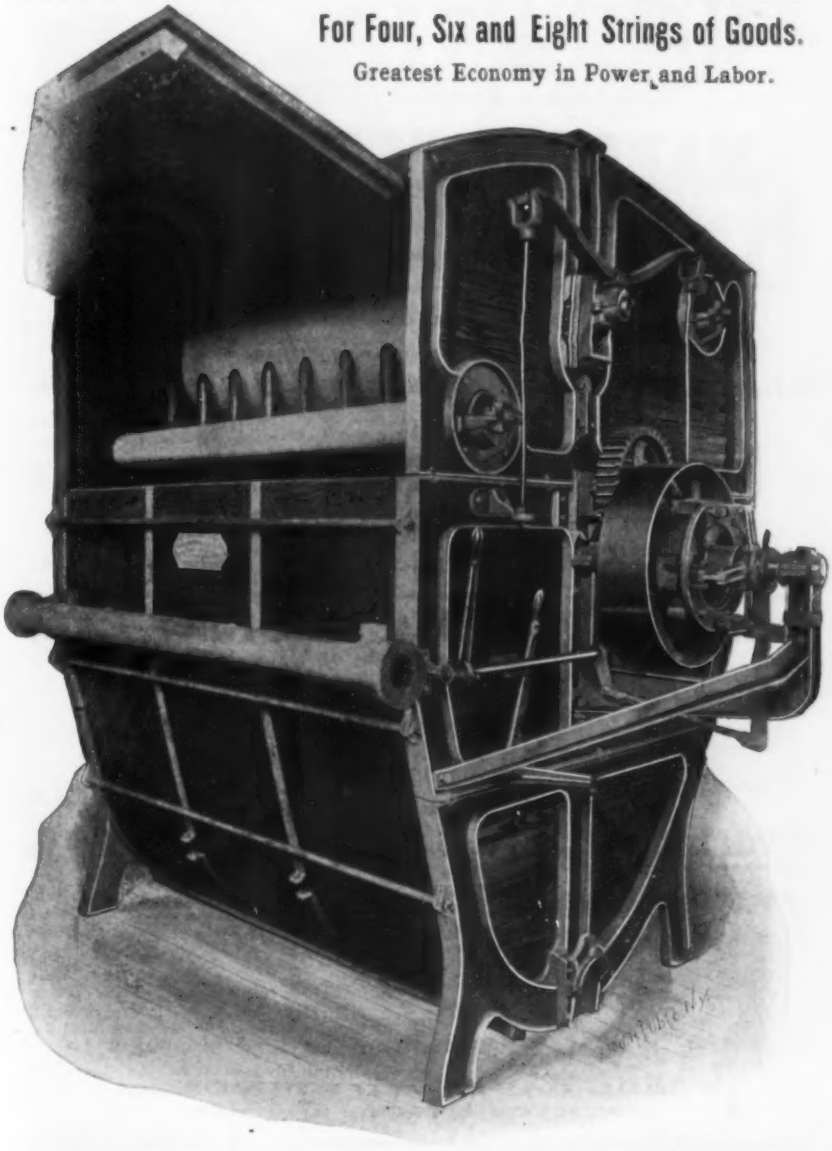

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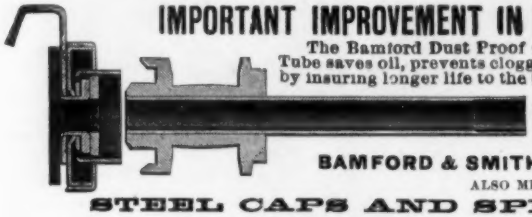

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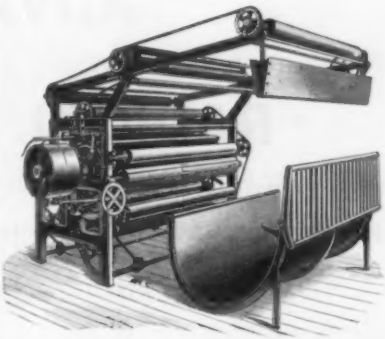

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It is the only full automatic machine made to be fastened to a bench, occupying no more space than semi-automatic machines.

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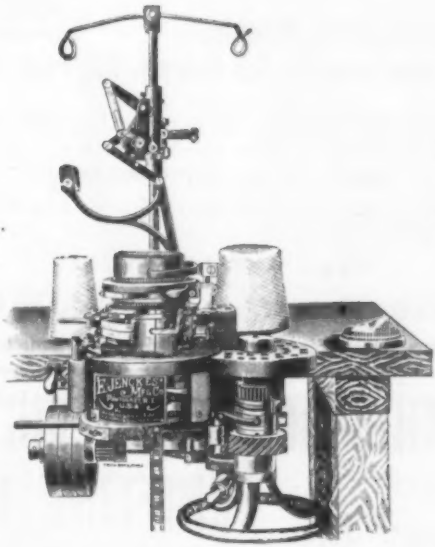

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A simple and positive attachment can be applied for **making high spliced heels and double soles automatically**, at the same time the heel and toe are reinforced by an extra thread. The splicing arrangement is supplied with yarn from a bobbin holding a quantity of yarn, and not from a small cop such as is usually used in devices of this kind.

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The speed of the machine is reduced just before changing from circular to reciprocatory knitting, thus avoiding all shock. All parts are interchangeable.

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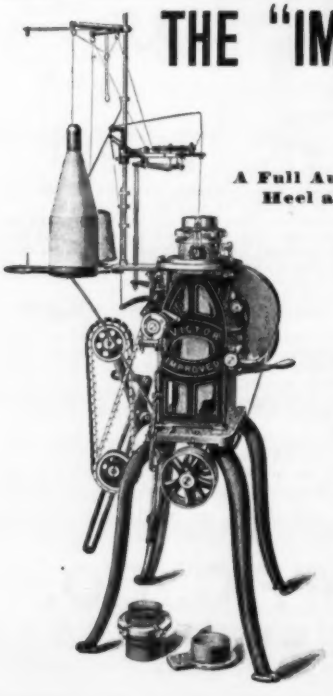

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A Full Automatic Seamless Machine for High-Spliced Heel and Double Sole, With Reinforcing Thread Automatically Inserted and Thoroughly Interchangeable in All Its Parts.

SIMPLE CONSTRUCTION
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Automatic Yarn-Changer and Plaiter

Positive and Fully Automatic in ever movement.

The yarn changing and plaiting and high-spliced heel and double sole attachments are readily applied, and do not require seperate machines to be used.

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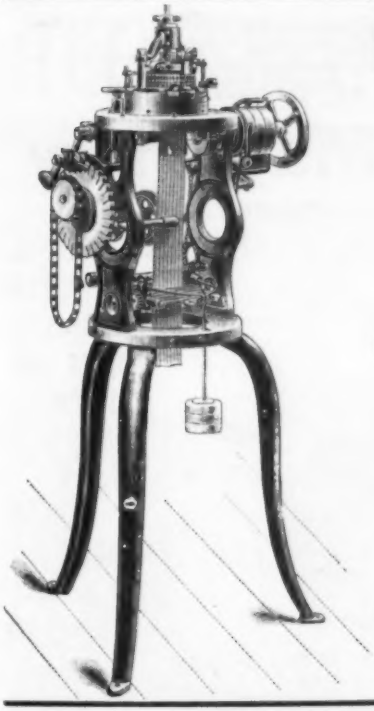

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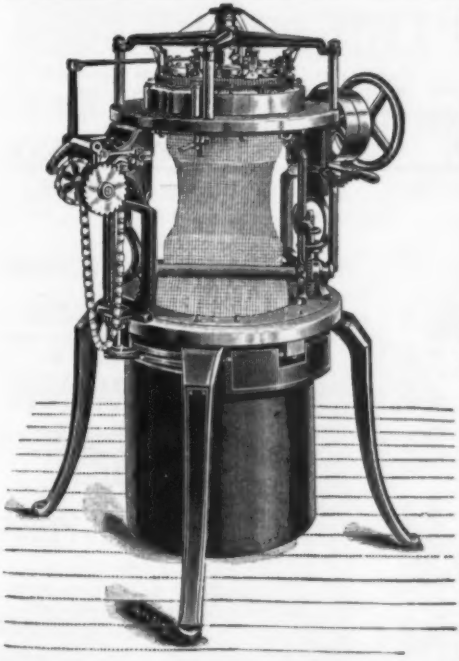
Single Feed Automatic Ribber

With Welt and Slack Course for Half Hose Tops and Rib Legs, Etc.



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Hand or Power,

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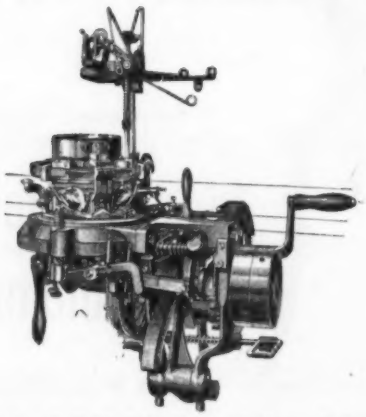

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Estimates for Plants Complete.

7-8 Automatic Knitting Machine. All Sizes, all Gauges.

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Carefully designed and well made with Solid Forged Steel Cylinderr and Dials, Segmental Cam Rings, Encased Take-up, Stop Motions, etc. Standard Sizes, Reasonable Prices. Also

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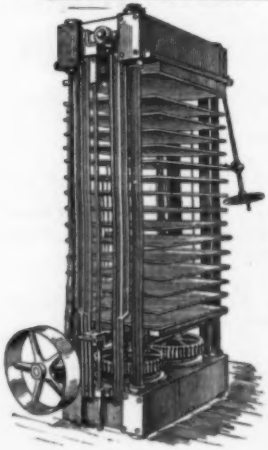

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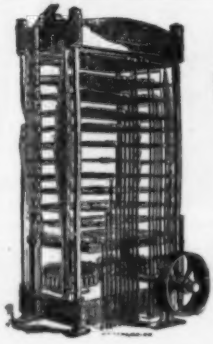

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The most reliable machine of the kind on the market.

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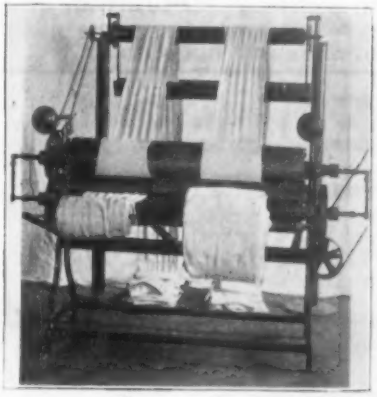
Of Highest Speed, Less Needle Breakage, Less Seconds, Largest Production.



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Steaming, pressing, drying and folding in one operation.

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24 feeds. Cut 14 to inch.

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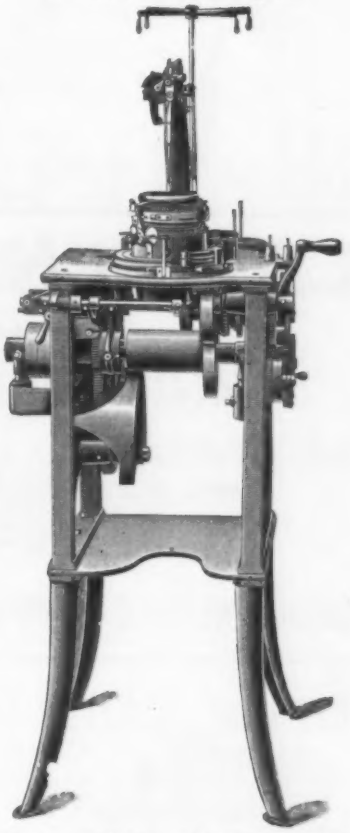

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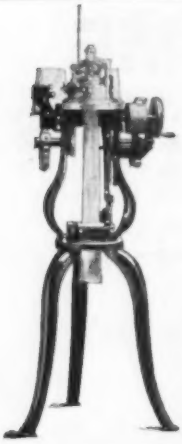

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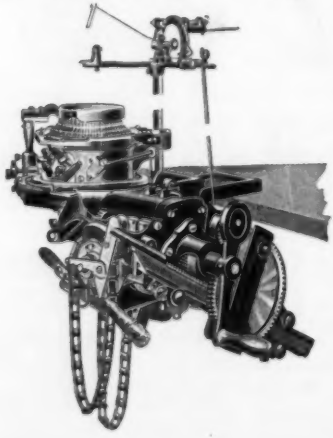

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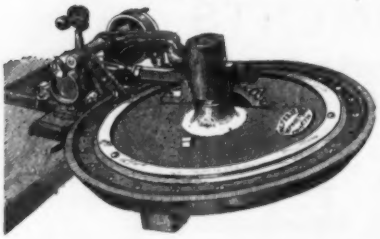

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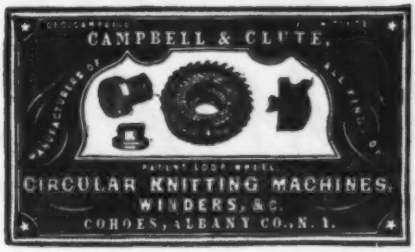

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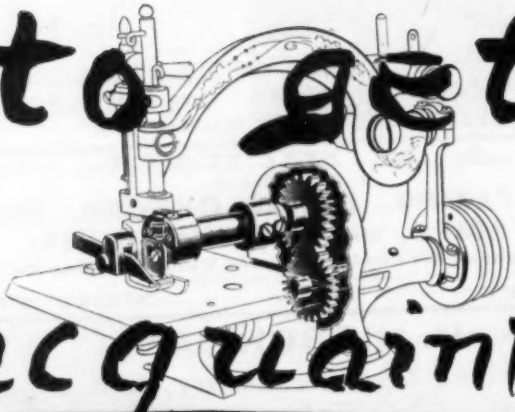
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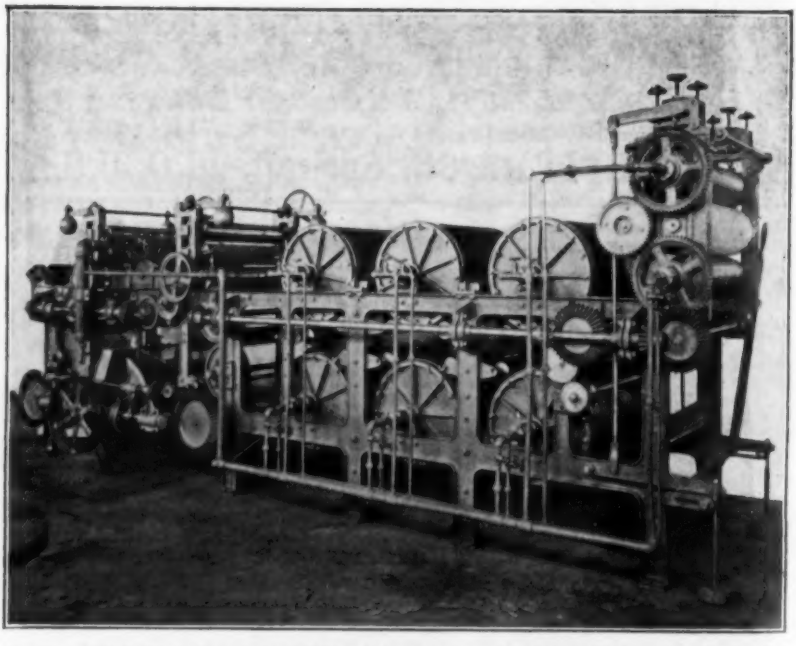

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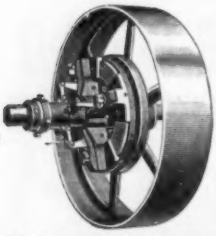

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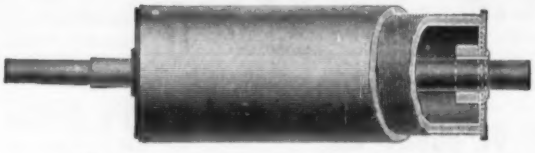

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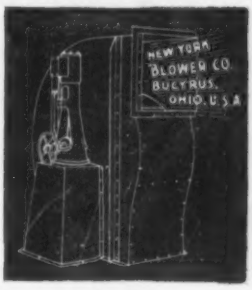

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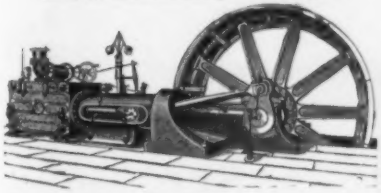

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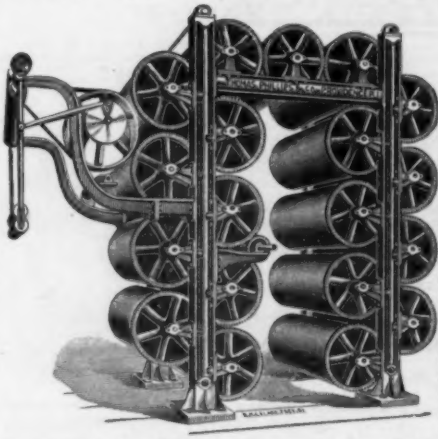

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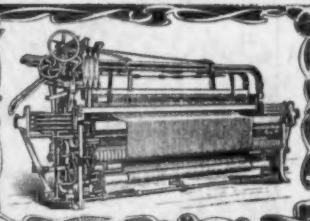

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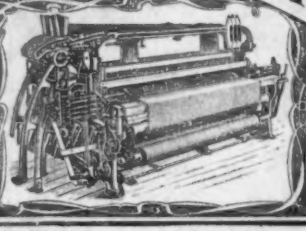

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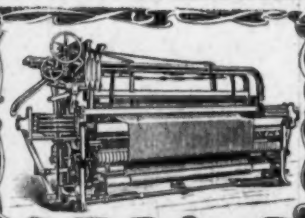

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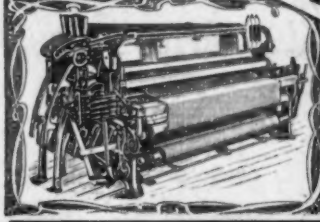

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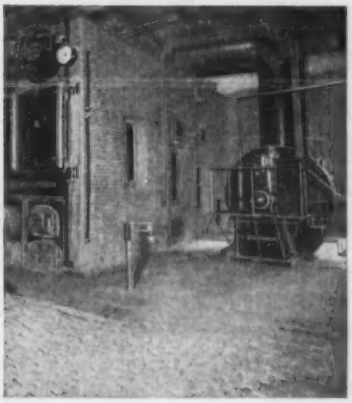

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Burns cheap fuel.
Increases boiler capacity.
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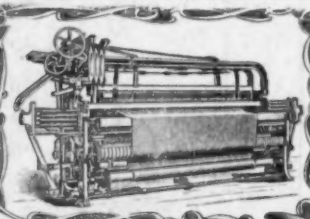

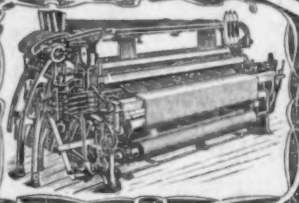

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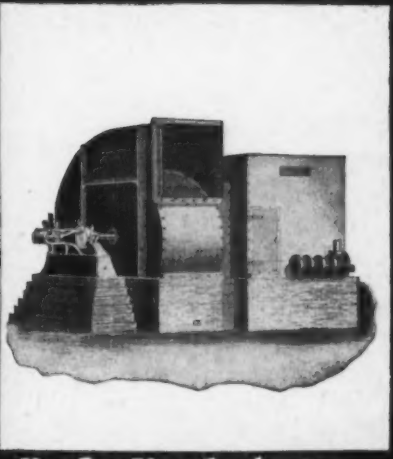

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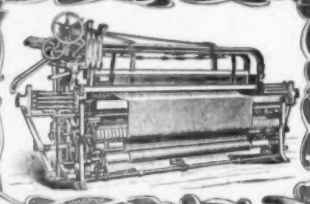

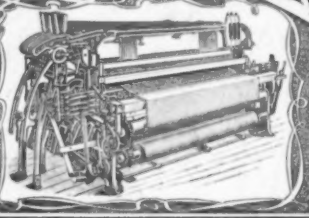

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FANS

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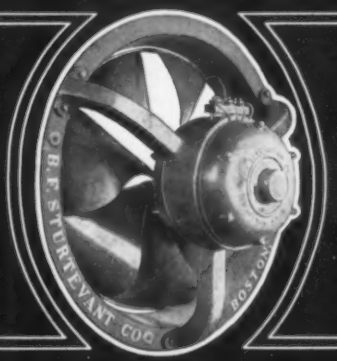

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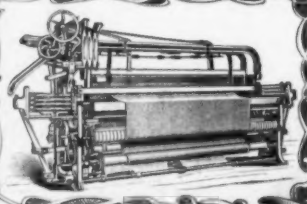

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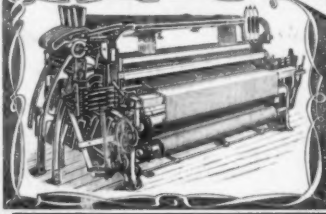

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Office, Patterson Nat. Bank, Patterson, N. J.

Mill Building a Specialty.
References made to some of the largest millowners in the Middle States, including Clark Thread Co., Newark, N. J.; Barbour Flax Spinning Co., Paterson, N. J., and others